Mc0073

Catering department

Health Building Note 10

NATIONAL HEALTH SERVICE IN SCOTLAND
ESTATES ENVIRONMENT FORUM

NHS Estates
An Executive Agency of the Department of Health

Catering department

Health Building Note 10

London: The Stationery Office

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ESTATES ENVIRONMENT FORUM

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About this series

The Health Building Note series is intended to give advice on the briefing and design implications of Departmental policy.

These Notes are prepared in consultation with representatives of the National Health Service and appropriate professional bodies.

Health Building Notes are aimed at multidisciplinary teams engaged in:

- designing new buildings;
- adapting or extending existing buildings.

Throughout the series, particular attention is paid to the relationship between the design of a given department and its subsequent management. Since this equation will have important implications for capital and running costs, alternative solutions are sometimes proposed. The intention is to give the reader informed guidance on which to base design decisions.

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Executive summary

Health Building Note 10 provides guidance to health authorities on the design and equipping of a range of catering facilities, including:

- conventional catering departments – where food is freshly prepared and cooked for each meal and served whilst hot to the patients and staff;
- central food production units (CFPU) – where food is cooked and then rapidly chilled or frozen, and stored in controlled low-temperature conditions before distribution to satellite end kitchens;
- satellite end kitchens – where chilled or frozen meals are received from the CFPU, assembled according to individual patient needs, loaded into trolleys and despatched to the wards for regeneration and consumption;
- ward kitchens and pantries – where meals are regenerated and served to patients;
- beverage and dining facilities for staff and visitors – including restaurants, food courts and vending machine services.

The main focus of this Note is the CFPU. Whilst it is recognised that the construction of a CFPU may not be appropriate for all trusts, the guidance on CFPUs will be of direct relevance in the planning and design of all types of catering system. The basic principles upon which conventional and CFPU-based catering systems are based are the same; conventional kitchens should conform with the workflow pattern and standards required for a CFPU. This Note therefore gives detailed guidance on the accommodation requirements for a CFPU and satellite kitchen, and then describes how this may be applied to conventional kitchens.

Schedules of accommodation are provided for:

a. a CFPU capable of producing 5,500 kg of food per day;

b. two sizes of end kitchen, conventional kitchen, restaurant and servery in an acute hospital serving:
   (i) 600 midday meals (300 in-patients and 300 staff);
   (ii) 1200 midday meals (600 in-patients and 600 staff).

It is incumbent on all health authorities to ensure that catering premises, including those of suppliers such as independent CFPUs, comply with all the relevant legislation.

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1.0 Scope of Health Building Note 10

Introduction

1.1 Health Building Note 10 has been prepared to provide guidance to health authorities for the design and equipping of:

a. conventional catering departments;

b. central food production units (CFPUs) and satellite end kitchens;

c. ward kitchens and pantries;

d. beverage and dining facilities for staff and visitors.

In the interests of clarity a glossary of the most frequently used terms has been included (Appendix 1).

1.2 This note reflects current Departmental advice contained in DH 'Chilled and Frozen' Guidelines on Cook-Chill and Cook-Freeze Catering Systems, 1989; the Food Safety (General Food Hygiene) Regulations 1995; the Food Safety (Temperature Control) Regulations 1995, and the 'Industry Guide to Good Hygiene Practice: Catering Guide'. These guidelines emphasise the need for the production of safe food. The recommended hazard analysis approach, based on some of the principles of hazard analysis and critical control points (HACCP), should also ensure that safe food is provided.

1.3 Health authorities should ensure that suppliers, that is, independent CFPUs, comply with all the relevant legislation.

1.4 Schedules of accommodation are provided for a CFPU capable of producing approximately 5500 kg (12,000 lb) of food per day, and for two sizes of end kitchen, conventional kitchen, restaurant and servery for an acute hospital serving:

a. 600 midday meals (300 in-patient and 300 staff midday meals)

b. 1200 midday meals (600 in-patient and 600 staff midday meals).

The ratio of staff to patients' midday meals varies from unit to unit.

Statutory and other requirements

1.5 Project teams should consult enforcing authorities in respect of legislation relevant to a particular project. The CFPU is required to conform to the Food Safety Act 1990 and Regulations made under this Act, the Health and Safety at Work etc Act 1974 and other statutory requirements. It should be designed and built so that its operation can meet the recommendations of the guidelines and regulations as indicated in paragraph 1.2. The advice of the District Consultant for Communicable Disease Control, the local Environmental Health Officer, Consultant Microbiologist and/or Infection Control Officer, should be sought throughout the formulation of the operational policy and the planning and design stages. Management systems should take account of the Health and Safety legislative requirements.

Catering systems

Conventional

1.6 Cook-serve is the conventional system of catering currently in use in many hospitals. Food is freshly prepared and cooked for each meal service and served whilst hot to the patients and staff. Food must either be kept hot, at or above 63°C, or cold, at or below 8°C, from portioning, during delivery and service to patients. For further guidance on food temperature good practice, refer to EL(96)37 'Hospital catering: Delivering a quality service'.

Central food production units

1.7 Economy may be achieved in terms of labour, provisions and other costs by centralising food storage preparation and cooking in a CFPU. The majority of CFPUs use a combination of the systems described below to produce a wide range of food to meet the needs of patients and staff.

1.8 A CFPU may provide chilled and/or frozen food. Where only small quantities of food are required, it may be more economical to produce a large batch and freeze it. This may then be held in the CFPU frozen food store until required. Emergency stocks of frozen food may also be held in satellite units' end kitchens.

1.9 Cook-chill means a catering system based on the full cooking of food followed by fast chilling and storage in controlled low-temperature conditions above freezing point (0°C to 3°C) and subsequent thorough reheating close to the consumer before consumption. It must be consumed within five days including the day of production. Foods not consumed within five days must be considered as unsafe and disposed of as waste food.

1.10 Cook-freeze means a catering system based on full cooking followed by fast freezing. The food should reach a core temperature of at least minus 5°C within 90 minutes of entering the freezer. Storage should be at controlled low temperature conditions well below freezing point (minus 18°C or below), with subsequent thorough reheating close to the consumer before consumption.

Purpose of a CFPU

1.11 The purpose of providing a central food production unit is to centralise purchasing, storage, preparation, cooking, chilling, freezing, regeneration and distribution to achieve economies of sale and consistent common meal quality standards. The achievement of this aim with maximum efficiency and economy is dependent on many factors, for example the provision of wholesome and nutritious food, suitable and efficient equipment, organisation and management, and the design of the CFPU building and end kitchens. These factors are closely related, for the design and layout of equipment will determine the staffing required and the method of organisation. In planning these services, account must be taken of the need to provide the following, which are not listed in order of importance:

a. hygienic and safe food handling facilities and procedures;

b. food storage in suitable and secure accommodation;

c. a safe, healthy and congenial working environment for staff working in the CFPU and end kitchens;

d. training facilities for CFPU staff;

e. training for end kitchen staff and for satellite ward and restaurant staff in the operation of the chilled food system, especially the distribution, reheating and service procedures;

f. restricted access for visitors to the CFPU;

g. quality assurance and monitoring procedures;

h. hazard analysis and critical control points system (HACCP).

Advantages of the system

1.12 By centralising the purchasing and storage, preparation and cooking of food for a health authority into one unit, savings may also be achieved in the end kitchens. Benefits may include the following, but are not listed in order of importance:

a. reduction in staffing costs in the end kitchen compared with a conventional system;

b. concentration of available skilled cooking staff in the CFPU unit;

c. smaller satellite catering departments;

d. improved control of cooking methods, and portion control leading to a consistent quality of meals produced in hygienic conditions to standard recipes;

e. improved service of meals to patients, with reheating at ward level;

f. reduction of bulk provision storage accommodation and handling in end kitchens;

g. improved working conditions and hours of duty for staff.

Disadvantages of the system

1.13 The system has the following disadvantages:

a. high initial capital and equipment cost of CFPUs;

b. capital cost of converting existing conventional central kitchens into end kitchens;

c. cost of adaptation of ward pantries;

d. cost of transport from CFPU to service units;

e. overall increase in energy consumption;

f. some foods do not reheat satisfactorily after chilling or freezing. This may limit the range of products compared with conventional kitchens.

Inclusions

1.14 This Health Building Note includes advice on the following facilities:

a. central food production unit:
   (i) goods reception;
   (ii) storage;
   (iii) hygiene control;
   (iv) preparation;
   (v) cooking area;
   (vi) portioning bay and chilling areas;
   (vii) chilled and frozen food stores;
   (viii) vehicle loading, unloading areas;
   (xi) transport;
   (x) pan and trolley wash area;
   (xi) offices, staff rooms and ancillary accommodation;
   (xii) quality control room;
   (xiii) waste disposal;

b. satellite end kitchen:
   (i) goods reception;
   (ii) storage;

(iii) hygiene control;
(iv) preparation;
(v) patients' and staff food service areas;
(vi) central wash-up;
(vii) offices and ancillary accommodation;
(viii) waste disposal;

c. patients and staff – service areas:
(i) ward pantry;
(ii) staff restaurant/servery;
(iii) food courts;

d. conventional kitchen on a hospital site.

1.15 Although a CFPU-based catering system will differ in scale and complexity compared with a conventional catering system, the principles upon which each system is based are the same. Conventional kitchens should conform with the workflow pattern and standards required for a CFPU. This HBN gives detailed guidance on the accommodation requirements for a CFPU and satellite accommodation and then describes how this may be applied to conventional kitchens, although the ultimate range of facilities should be determined locally.

1.16 While it is recognised that the construction of a CFPU may not be appropriate for all trusts, the guidance on CFPUs will be of relevance in the planning and design of all types of catering system.

Feasibility studies

1.17 A detailed review of the entire existing catering services and operating costs in the existing kitchen should be carried out before commencing the feasibility study. These costs, along with agreed and quantified meal quality requirements, will determine the viability of establishing a CFPU and will form the basis of the brief. The advantages and disadvantages should be listed and evaluated before the final decision is reached, including the possibility of using commercially prepared food. Savings will need to be identified, both capital and revenue, and set against the costs of a CFPU.

Cost allowances

1.18 The Departmental Cost Allowances associated with this HBN are promulgated in 'Quarterly Briefing' (issued separately under cover of an Estates Policy Letter) on behalf of the NHS Executive.

Equipment

1.19 Equipment is categorised into four groups, as follows:

a. Group 1: items (including engineering terminal outlets) supplied and fixed within the terms of the building contract;

b. Group 2: items which have space and/or building construction and/or engineering service requirements and are fixed within the terms of the building contract but supplied under arrangements separate from the building contract;

c. Group 3: as Group 2, but supplied and fixed (or placed in position) under arrangements separate from the building contract;

d. Group 4: items supplied under arrangements separate from the building contract, possibly with storage implications but otherwise having no effect on space or engineering service requirements.

1.20 Group 1 items are provided for in the Departmental Cost Allowance associated with this Note. The Department of Health Equipment Cost Allowance Guide (ECAG) specifies a sum of money for the functional unit for Groups 2 and 3; the ECAG does not cover Group 4.

Capital Investment Manual

1.21 The Capital Investment Manual (England and Wales) contains the NHS Executive's procedural framework governing the inception, planning, processing and control of individual health building schemes. There are various mandatory requirements within this overall process, but the way these tasks are carried out is mainly for NHS trusts and health authorities (for directly managed units), as appropriate, to determine. Approval from the NHS Executive for business cases will depend on how they intend to carry out the mandatory tasks. The Manual gives guidance on the technical considerations of the full capital appraisal process and also provides a framework for establishing management arrangements to ensure that the benefits of every investment are identified, realised and evaluated. It emphasises three key points:

a. each individual scheme must be supported by a sound business case. A business case must convincingly demonstrate that the investment is economically sound (through an option appraisal) and financially viable (affordable to the trust and its purchasers);

b. an exploration of private finance alternatives should be viewed as a standard option whenever a capital scheme is being considered. Once the Outline Business Case has been approved, the preferred

option should be compared to potential private finance alternatives. Approval to the Full Business Case will not be given unless there is a clear demonstration that private finance alternatives have been adequately tested;

c. the delivery of a major capital project is a difficult and complex task. Nevertheless, failure to deliver on time and to cost diverts resources from direct patient care. The establishment of an appropriate project organisation is essential to ensure that projects are delivered within agreed budgets and timescales.

Works Guidance Index

1.22 This volume indexes under subject references much of the relevant guidance that is current at the time of publication. Specific issues, such as arrangements for dealing with fire, security, energy conservation etc, are also covered by other published guidance which must be taken into account. It is recommended that project teams check the current edition of the Works Guidance Index and investigate the possibility of changes occurring since its publication.

2.0 Service and general functional and design requirements for central food production units

2.1 A central food production unit (CFPU) is concerned solely with the large-scale production and storage of food. The service of meals will be carried out in the satellite units. By centralising food production, a high level of equipment and energy utilisation can be achieved to ensure a cost-effective operational unit. The skilled cooking staff can be concentrated in the CFPU. If the CFPU is to be located on a hospital site, that hospital's end kitchen and service area must be a separate unit. The guidance in this Note relates to a completely separate CFPU, as the mixing of production techniques with daily service arrangements in a CFPU could result in a high risk of cross-contamination, lower standards of hygiene, and reduced productivity.

2.2 Because of the high capital cost of a CFPU it may be more commercially viable for two or more health authorities to jointly plan, finance and operate one unit. A CFPU may also provide a service to organisations outside the healthcare sector, for example schools, residential care homes etc.

2.3 A project team should be formed to produce a detailed plan and an operational policy for the CFPU. The team should liaise with the local authority environmental health department or, in some instances, their own consultant Environmental Health Officer, and should include representatives from the following departments: administration; building design team; catering; dietetics; domestic services; environmental health; estate management; infection control; nursing; supplies; and from the satellite hospitals and other purchasers to be provided with a food service. The advice of the local fire authority should be sought.

Sizing

2.4 To ensure economic viability, CFPUs will need to be sufficiently large to achieve economies of scale. This Note provides a schedule for one size of CFPU only, but this may need to be varied according to local policy. Project teams should consider the range and quantity of food to be provided to health units and other purchasers. The menus of the purchasing units will form the basis for the calculation of the workload. Several factors will also have to be taken into account:

a. the range of food to be offered on the menu for patients and staff in the satellites;

b. the number of days that the menu covers (most use a 14-day cycle of menus);

c. the size of portions.

Some rationalisation of each satellite's menu may be required to ensure the efficient and economic production of food. The number of satellite units to be provided with food will have to be agreed. A contract of reasonable duration should be drawn up between the health authorities to ensure that the CFPU will be financially viable. The final format of menus for patients and staff and the nutritional content of each dish should be agreed with the dietitians concerned. Other purchasers, for example "meals-on-wheels" for a local authority, should be consulted to provide an accurate estimate of the total range and number of meals to be provided by the CFPU. It is important to ensure that other purchasers have suitable distribution, storage and reheating policies to prevent food safety and meal quality failures in the system. Health authorities should be satisfied that the systems and premises used would not cause the breakdown of the system.

2.5 The CFPU should be capable of producing a wide range of nutritious and wholesome foods to meet the needs of patients, staff and others. Where a single day's demand for a particular item is too small for an economic production run, a large batch, sufficient for several days, may be produced and then rapidly frozen or chilled.

2.6 All the food items to be produced in the CFPU should be listed, giving the size of portion, recipe to be used, method of production and whether the item is to be chilled or frozen. The CFPU will be required to produce a large range of items for each meal, and will therefore be producing smaller quantities of items than a commercial unit, reducing the need for very large capacity cooking equipment.

2.7 The total weight of each item of food required per day per meal per unit will have to be calculated, and any additional or projected needs should be included.

2.8 The following information should be obtained from each of the satellite units served:

a. *patients:* the total weight of each item of food required per meal per day for in-patients and day patients. The following points should be noted:

   (i) breakfast: the breakfast meal may be a "continental type" made up of ingredients supplied to the ward pantry by the satellite hospital's own provisions store. Where a cooked dish is required, this may be provided by the CFPU;

(ii) lunch and supper: the number of items of food required will depend on the range of items offered on the menu;

b. *staff:* the total weight of each item of food required per meal per day for staff including those on night duty will also have to be calculated. Any variable factors such as reduced demand at weekends, and any conferences and functions, should be included to ensure an accurate total. The following points should be noted:

(i) breakfast: this meal may be cooked to order in the end kitchen or in the staff restaurant servery, using back-bar equipment. The food will be provided from the end kitchen provision store;

(ii) lunch and supper: the number of items of food required will depend on the range of items offered on the menu;

c. *others:* any additional meals required, for example for visitors in the cafeteria, for an education centre, staff club, or other purchasers.

2.9 This Note assumes that the minimum CFPU operation is as follows:

a. produces food five days a week;

b. operates for eight hours a day, or one shift;

c. produces food over six hours each day;

d. chills and freezes food for six hours plus one overnight load.

This Note describes a CFPU capable of producing approximately 5500 kg (12,000 lb) of food each day giving a total of approximately 27,500 kg (60,000 lb) per week (5 days).

2.10 The production of food can be increased by:

a. extending the length of the day shift;

b. working two shifts – an early and a late one;

c. working three shifts – two day shifts and a night shift;

d. operating the CFPU seven days a week.

Production can also be increased by "buying in" a high percentage of ready-prepared food, though this may incur higher costs to the satellite users.

2.11 The total weight of food required for all the satellite units can then be calculated to determine the quantity of food to be produced in the CFPU each day. The largest single day's production requirements should be used as a basis for calculating the size of CFPU required. This figure can also be used for calculating the size of storage, preparation, cooking and chilling equipment required and the holding capacity of the chilled and frozen food stores by:

a. the number of units to be supplied;

(i) the number of meals to be supplied;

(ii) the total quantity of food for the meals for each unit;

b. the method of distribution and whether the containers of food are to be delivered to units in:

(i) large insulated mobile boxes;

(ii) small stackable insulated boxes; or

(iii) a combination of (i) and (ii);

c. the number of days stock is to be held in the CFPU before despatch to the satellite units;

d. the frequency of deliveries.

2.12 This guidance assumes that a CFPU will prepare a proportion of the food from raw ingredients.

2.13 The above information can now be used to draw up a schedule of production for the CFPU showing each day's production, chilling, holding and despatch needs. See Table 1.

Food containers

2.14 Food containers are used throughout a cook-chill system from food preparation to reheating. After cooking the hot food will be portioned into shallow food containers to a depth not exceeding 40 mm, to ensure that the chilling or freezing of the food is completed within 90 minutes.

2.15 The food in the containers may weigh approximately 1 to 2 kg (3 to 5 lb) depending on the type of food. The containers will be loaded onto mobile racks which hold between 18 and 30 containers, giving a total weight of food (excluding the weight of containers and lids) of between 27 and 68 kg (60 and 150 lb).

2.16 The racks of food in containers will be wheeled from the cooking area to the portioning room for checking, weighing and labelling of both containers and their lids. The racks of food will then be wheeled from the portioning room into the chillers or freezers. The process from hot portioning to the start of the chilling/freezing process should be completed within 30 minutes.

2.17 It is essential to ensure that the racks selected are compatible with the chillers and freezers to minimise handling.

2.18 On completion of chilling or freezing, the racks of (chilled or frozen) food will then be moved into the chilled or frozen food stores and held until required. When

Day	Production	Storage	Dispatch
	Food cooked and chilled for DAY – MEAL	Food stored overnight for DAY – MEAL	Food dispatched for DAY – MEAL
Monday	Wednesday – Lunch Wednesday – Supper Thursday – Lunch	Wednesday – Lunch Wednesday – Supper Thursday – Lunch	Tuesday – Lunch Tuesday – Supper
Total Meals	3	3	2
Tuesday	Thursday – Supper Friday – Lunch Friday – Supper	Thursday – Supper Friday – Lunch Friday – Supper	Wednesday – Lunch Wednesday – Supper Thursday – Lunch
Total Meals	3	3	3
Wednesday	Saturday – Lunch Saturday – Supper Sunday – Lunch	Saturday – Lunch Saturday – Supper Sunday – Lunch	Thursday – Supper Friday – Lunch Friday – Supper
Total Meals	3	3	3
Thursday	Sunday – Supper Monday – Lunch Monday – Supper	Sunday – Supper Monday – Lunch Monday – Supper	Saturday – Lunch Saturday – Supper Sunday – Lunch
Total Meals	3	3	3
Friday	Tuesday – Lunch Tuesday – Supper	Tuesday – Lunch Tuesday – Supper	Sunday – Supper Monday – Lunch Monday – Supper
Total Meals	2	2	3
Saturday	NIL	Tuesday – Lunch Tuesday – Supper	NIL
Total Meals	0	2	0
Sunday	NIL	Tuesday – Lunch Tuesday – Supper	NIL
Total Meals	0	2	0

Table 1 Exemplar CFPU food production, storage and despatch schedule. This table assumes 5-day production and two main meals per day for each unit

required, they are moved to the assembly part of the chilled food store for redistribution on the racks designated for each end kitchen.

2.19 Large satellite units may require several racks of containers for one day's requirements. For a satellite unit with a small demand, the containers may be packed into stackable insulated boxes which hold three to six containers. The boxes will be stored on mobile bases.

2.20 A choice must be made between reusable and disposable containers, as this has an effect on equipment, space requirements and capital and revenue expenditure.

Reusable food containers

2.21 Reusable food containers are of stainless steel with fitting lids; the most popular size is the 1/1 "Gastronorm" 45 mm deep. These containers are high in capital cost but low in revenue costs. A large reserve stock is required, as the system may have three to four days' requirements in use at any one time. For example, 2000 containers will be required to hold 5500 kg (1200 lb) of food for one day's production, 8000–10,000 will be required to cover four days in use, storage and transport. Container washing machines and operators are required. Although stainless steel is a robust material, some damage and loss is inevitable, and damaged containers or lids must be withdrawn for replacement or repair. Holding space for racks of containers prior to use and on return from end kitchens must be provided. Mobile racks with ledges to support the containers by their flanges will be required.

Disposable food containers

2.22 Disposable food grade containers may be ovenable board, foil or plastic: the most popular size is the 1/2 "Gastronorm" 45 mm deep. These containers are low in capital cost, but incur a revenue cost. To ensure economic purchasing in bulk, additional storage space may be required. Container washing equipment or operators are not required. Mobile racks used to transport disposable containers must have slatted shelves to support the containers, as they cannot be stacked on top of one another. Disposable containers are available ready formed. Special lidding and sealing equipment will be required. Board containers can be supplied in flat sheets, but for these automatic forming machinery is required, sited in a clean area. Staff will be required to operate this machinery.

2.23 A comparison between the capital cost of reusable and the revenue cost of disposable containers is difficult to calculate precisely, because of so many variables. The problems of collection, holding and disposal after use need to be considered in the end kitchens.

Distribution

2.24 The size and type of vehicle used will depend on many factors including the quantities to be delivered, the number of satellite units, distances to be covered and time taken to deliver. The correct method of distribution is by refrigerated vehicle.

Engineering services

2.25 Much of the equipment will be heated by gas, and most equipment will require an electricity supply. A standby electricity supply will be required for refrigeration plant, controls and emergency lighting. Liquid gas containers must comply with the appropriate safety precautions. Detailed engineering requirements for a CFPU and end kitchens are to be found in the engineering chapter.

2.26 The project team should note the following points:

a. service entry holes and ducts must be pest-proof and waterproof as far as is reasonably practicable;

b. pipe and cable runs must NOT be routed over cooking or preparation equipment;

c. pipe insulation must be easily cleaned, impervious to water, and sealed to prevent the harbouring of pests and insects as far as is reasonably practicable;

d. the finish of all equipment and service connections must be able to withstand frequent cleaning;

e. electrical socket-outlets, light fittings and switches should be splashproof;

f. switchrooms should be accessible only from the circulation area – that is, outside food production areas.

2.27 The equipment in the cooking area will require electricity, gas, hot and cold water services. Equipment should be grouped and serviced from a central service spine, connected via flexible pipes with quick-release bayonet or socket/plug fittings. Mains services to the service spine, enclosed for ease of cleaning, can be supplied from above or below.

2.28 The space surrounding equipment must allow access for engineering/maintenance staff and for regular cleaning. Mobile worktops sited alongside cooking equipment will also permit easy access to the spine of services. The provision of flexible service connections to each unit and the use of lockable castors or integral rollers will allow cooking equipment to be moved to enable cleaning machines to pass over the whole floor area.

Drainage

2.29 The drainage system requires particular attention to ensure isolation from any potential sources of pollution. It should be connected directly to the main sewer. High-level drainage runs are not acceptable within the roof space, as failure of pipework or fittings in such a position presents an unacceptable hazard.

2.30 Surplus cleaning water should be removed by suction floor cleaning machines; floor gullies should not be provided except for the discharge from boiling and bratt pans. Mobile sinks and hand-wash basins should discharge into raised, non-splash, trapped, stainless steel tundishes. Gratings should be removable for regular washing. If grease traps are required to comply with local regulations, they should be sited outside the building to avoid any risk of contaminating the floor of the building during cleaning procedures. Grease traps should be cleaned and maintained regularly by trained operatives. There should also be provision for collecting condensation water from the blast chillers.

2.31 The interior layout of the building and its extreme dimensions should be such that all drain lengths can be rodded from outside the building. Untrapped access points into drains are not acceptable within the building. Branch drains should not be located opposite each other. Flow in drainage pipes should always be away from high-risk areas. Inspection chambers should be sited outside the building and must be properly sealed and regularly inspected and maintained.

Water supply

2.32 A potable water supply is required in each room where food is handled or where utensil cleaning may be required.

2.33 Taps in food areas should be fitted with individual stopcocks. A separate sampling tap is recommended.

2.34 Mixer taps should not be used in any food sink, though thermostatically controlled mixer taps may be used for hand-wash basins.

2.35 Hot water should be available in all food areas. The discharge temperature of hot-water supplies to sinks should be 60°C. Warning notices of the temperature may be required to be displayed.

2.36 Advice on water hardness, softening and use of private and public supplies in given in HTM 2027 – 'Hot and cold water supply, storage and mains services', and further advice should be sought from the local water authority.

3.0 Environmental health and finishes considerations in central food production units and satellite end kitchens

Introduction

3.1 The central food production unit (CFPU) and end kitchens should be designed to ensure that high standards of food hygiene can be achieved and maintained. For guidance on statutory requirements, refer to paragraph 1.5.

3.2 It is essential that cooked and raw foods are kept separate to reduce the risk of cross-contamination. They should be stored at the correct temperatures. The use of mobile racks minimises the handling of food.

3.3 Before staff enter the preparation or cooking/portioning areas they must use the hygiene control facilities dedicated to these areas. It is essential to ensure appropriate standards of personal hygiene for the staff; stainless steel hand-wash basins should be provided in each of the preparation spaces and in the cooking and portioning areas. Non-hand operated taps should be specified. Paper towels should be provided for hand drying. To avoid contamination, hand-wash basins must not be sited adjacent to food preparation equipment.

3.4 Staff changing, shower and WC facilities should be in the staff accommodation wing of the CFPU.

3.5 Food premises must be kept clean and maintained in good repair and condition. Good practice requires systematic cleaning schedules for all surfaces and equipment. Day-to-day cleaning should be by cleaning staff using cleaning machines and facilities dedicated to each area. The equipment should be colour-coded to ensure use in the correct area. The CFPU will also require regular deep-cleaning. This should be carried out by specialists when the unit is not in use. All finishes to walls, floors, ceilings, work surfaces and equipment must be capable of withstanding regular cleaning.

Ventilation and air-conditioning

3.6 It is necessary to give special attention to environmental design in central food production units to provide comfortable and safe conditions for the people who work there. In the CFPU the whole building, other than staff accommodation, will be sealed and air-conditioned. Air supply to the portioning room should be filtered or otherwise treated to remove particles to a minimum of Class 3 of BS 5295 Part 1: 1989. The balance of air flow should maintain the area at a positive pressure with respect to the raw materials and tray wash areas, with the air flow direction towards the raw material preparation areas and away from the high risk areas where finished products are assembled.

3.7 The number of air changes and conditioning of the air should eliminate condensation and maintain the temperature at 10°C or less in selected areas. Project teams should achieve the recommendation contained in HSE Information Sheet 'Workroom temperatures in places where food is handled' and the Refrigerated Food Industry Confederation 'Guidance on work in cold indoor environment'.

Noise

3.8 In the storage and production areas most of the finishes and work surfaces are hard and the building will be noisy and reverberant. It is possible to improve the acoustic environment by introducing sound-absorbent materials, but the only surface not vulnerable to damage is the ceiling. Sound-absorbent materials used here must be capable of withstanding wet cleaning and disinfection without deterioration. In staff areas, for example offices, changing rooms etc, which are not used for any part of the food production process, acoustic ceilings may be used to the standard specified for general use in a hospital.

Natural and artificial lighting

3.9 A high level of glare-free lighting is required (see engineering chapter). Wherever practicable, fixed outside windows with clear glass and glazed internal partitions should be provided as well as artificial light to relieve what might otherwise be a claustrophobic environment. In the storage and production areas, lighting luminaires should have shatter-proof diffusers and be integral and flush with the ceiling. Any lighting incorporated in the ventilation hoods should be waterproof.

Pest control

3.10 Precautions should be taken where practical to prevent the entry of insects, rodents and other pests into catering premises. Overhanging roofs, light fittings, girders

and beams should be protected to prevent the entry of birds. All outer doors should be pest-proof, particularly sliding doors and roller shutters. All staff should be advised of the need for preventive pest control and the action to be taken should evidence of pests or infestation become apparent. Where electric flykilling units are used they should be carefully sited to ensure maximum effect and to prevent contamination of food, utensils, work surfaces and production lines. Expert advice should be sought on suitable models, number required, siting and maintenance. Ceiling voids and ductings must be accessible from outside the high-risk areas for inspection or treatment purposes. Full use should be made of 'Health Service Catering – Hygiene', Domestic Services Advice Note 5 'Introduction to Pest Control in Hospitals', and HSG (92)35 'Pest control management for the NHS' and accompanying booklet. Project teams should also refer to the Pesticide Regulations in the Food Environment Act 1985, Part 3.

Disposal of food waste

3.11 The disposal of food waste is a matter of local policy which will depend on the availability of approved contractors to remove it, and whether the local water authority has any restriction on the volume of waste food that may be discharged into the public sewer by waste disposal units. The most hygienic and preferred method of disposal is by food waste-disposal units. These units should be located in the CFPU preparation rooms, central wash-up and pot-wash and similar areas in the end kitchens.

Refuse

3.12 Refuse should be compacted before disposal. Waste disposal areas should have separate access, and be pest- and rodent-proofed as far as is possible. A water supply and floor-level drains are required.

Finishes – general

3.13 All surfaces will be subject to regular and extremely hard cleaning. All finishes must be robust enough to withstand this without deterioration. Materials and finishes must also be able to survive mechanical impact by mobile equipment. Corners must be protected, but the protection must not give rise to uncleanable crevices. Colours should generally be light. Reference should be made to HTM 69 – 'Protection'.

Floors

3.14 Throughout the bulk provision stores, cold stores, preparation areas, production areas and pot-wash, a uniform floor level must be maintained. The floor finish must be hard-wearing, non-absorbent, waterproof and easy to clean, with a smooth slip-resistant finish. The use of figured or raised-pattern tiles should be avoided, as the passage of trolleys across them is noisy. Where tiles are used, grouting should have a level, flat finish. The flooring should be turned up at walls in an integral coved skirting which should form a continuous finish with the floor and be flush with the wall finish.

3.15 The choice of finish, and the design of the screed and sub-floor, should take account of the heavy traffic of trolleys and the occasional movement of heavy equipment on pallet trucks.

3.16 Carpets are suitable for use in the offices and staff room. For further information on soft floor coverings see HTM 61 – 'Flooring'.

Ceilings

3.17 It is of primary importance that the type of ceiling chosen should be hygienic and easy to maintain and, whilst conventional extract canopies over cooking areas can contain fat, grease and vapour effectively, special proprietary ceiling systems (for example ventilated ceilings) should be considered if they can be shown to:

a. prevent carryover of fat, grease and moisture to the ceiling void;

b. remove grease, fat, vapour products of combustion and heat at source (the latter is important from a staff comfort viewpoint).

3.18 In cooking areas, the ceiling should be smooth, sealed and jointless. All light fittings should be flush-mounted and sealed. The ceiling and extract canopies should be easy to clean. Elsewhere, ceiling panels should be smooth and easily cleaned. Access to ducting should be from interstitial space. Reference should be made to HTM 60 – 'Ceilings'.

Walls

3.19 Walls within and surrounding the CFPU and end kitchen should be of solid construction. There should be no interior ledges where dust and grease can collect. Wall finishes must be durable, non-absorbent, waterproof, washable and resistant to abrasive cleaning agents. They should be easy to maintain and clean and should be flush with the coved floor skirting. Wall surfaces in offices may be plastered to a hard, smooth finish and decorated.

3.20 In heavy traffic areas, the walls are vulnerable to damage and must be protected. The appropriate level of protection should be considered for each space. To minimise damage from mobile racks, pallet trucks or trolleys, they should be fitted with bumpers. The appropriate type, position and correct height of protective linings or buffer rails on walls and equipment should then be matched and no gaps allowed to prevent insect harbourage. Buffering should be specified on all mobile equipment. Where traffic is heavy and trolleys are used, all door linings and external corners on walls will require protection. The container wash-up space and the chilled meal store are probably the most vulnerable, and these wall areas will require a very durable finish.

Windows

3.21 To reduce solar glare, tinted glass may be used. There should be no internal sills; exterior sills should be sloping to discourage birds. The staff rest room and offices should have windows, and any openable windows should be pest-proof. Reference should be made to HTM 55 – 'Windows'.

Doors

3.22 Doors should be wide enough for trolleys and equipment to pass through easily. They will need additional protection at heights related to equipment likely to cause damage, and external doors must be pest- and insect-proof, as far as is possible. All doors in food handling areas should have vision panels. Some doors may require security devices to allow access for designated staff only. For economy of space, chilled food stores and cold rooms may be fitted with sliding doors; flush thresholds are required to facilitate the passage of trolleys. Automatic cold air curtains should be fitted to maintain the temperature when the door of chilled food stores and cold rooms is open. Reference should be made to HTM 58 – 'Internal doorsets'.

3.23 The external sliding or rising door of the CFPU despatch bay needs careful design. It may be open for several minutes while food trolleys are passed through into the vehicles for despatch to satellite end kitchens. The vehicles should be refrigerated to an air temperature between 0°C and 3°C, as it is necessary to prevent cold air loss from the despatch bay or the vehicle while the doors are open during loading. There are automatic docking systems which seal the vehicle to the bay while the doors are open. A cold-air curtain should be provided to maintain temperature while docking.

4.0 Specific functional and design requirements for a central food production unit

4.1 This chapter provides guidance on the functional requirements and design implications for each of the activity spaces within a central food production unit (CFPU).

4.2 The building housing the CFPU must be free-standing and dedicated to this one function to ensure the maintenance of very high standards of hygiene at every stage in the process. The production of food must be isolated from any other function. It must not be connected directly to any end kitchen the CFPU may serve. The impact of the CFPU on the local neighbourhood must be considered during the drawing up of plans. Noise and odours from extract fans can be a particular problem, and all practical measures must be taken to ensure that the impact on the environment is as low as possible.

4.3 The CFPU should not be sited near to industrial processes producing strong odours which could taint the food, nor be subject to waterborne pollution from any source. The site need not be at the geographical centre of the catchment area, but the cost of transport to satellite end kitchens should be considered when calculating running costs.

4.4 The site should be reasonably flat so that the CFPU may be planned economically on one level. There should be sufficient space for parking and manoeuvring service and other vehicles. The CFPU should have easy access to a good road system to ensure reliable communication with the satellite end kitchens. The area should be served by a good public transport system to assist staff recruitment, and a staff car park should be provided.

Functional relationships

4.5 The CFPU provides a service to the satellite units (see Figure 1). The storage, movement and processing of materials should be organised as shown in Figure 2. Functional relationships of principal spaces within the unit are shown in Figure 3.

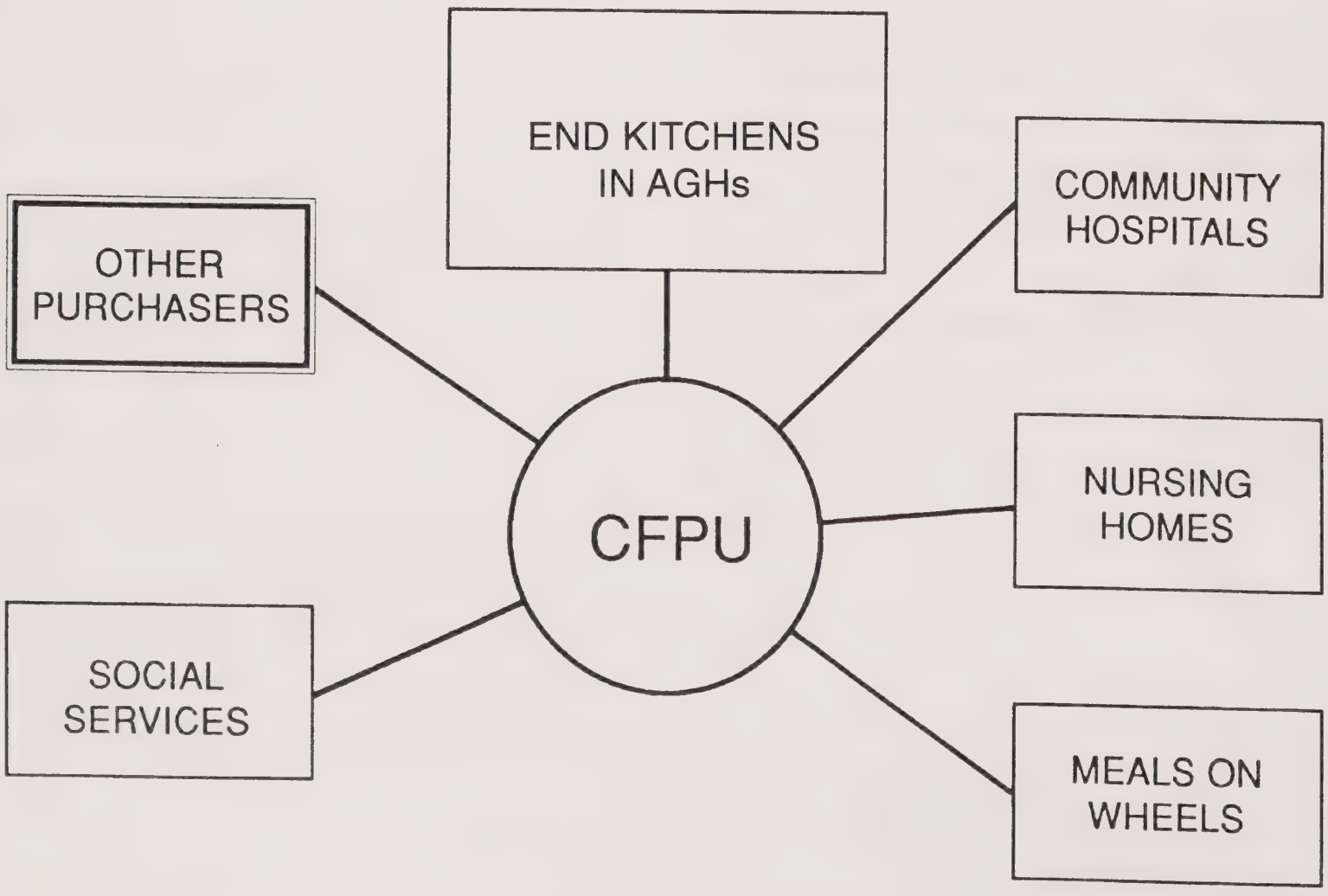


Figure 1 Distribution of food from CFPU to consumers

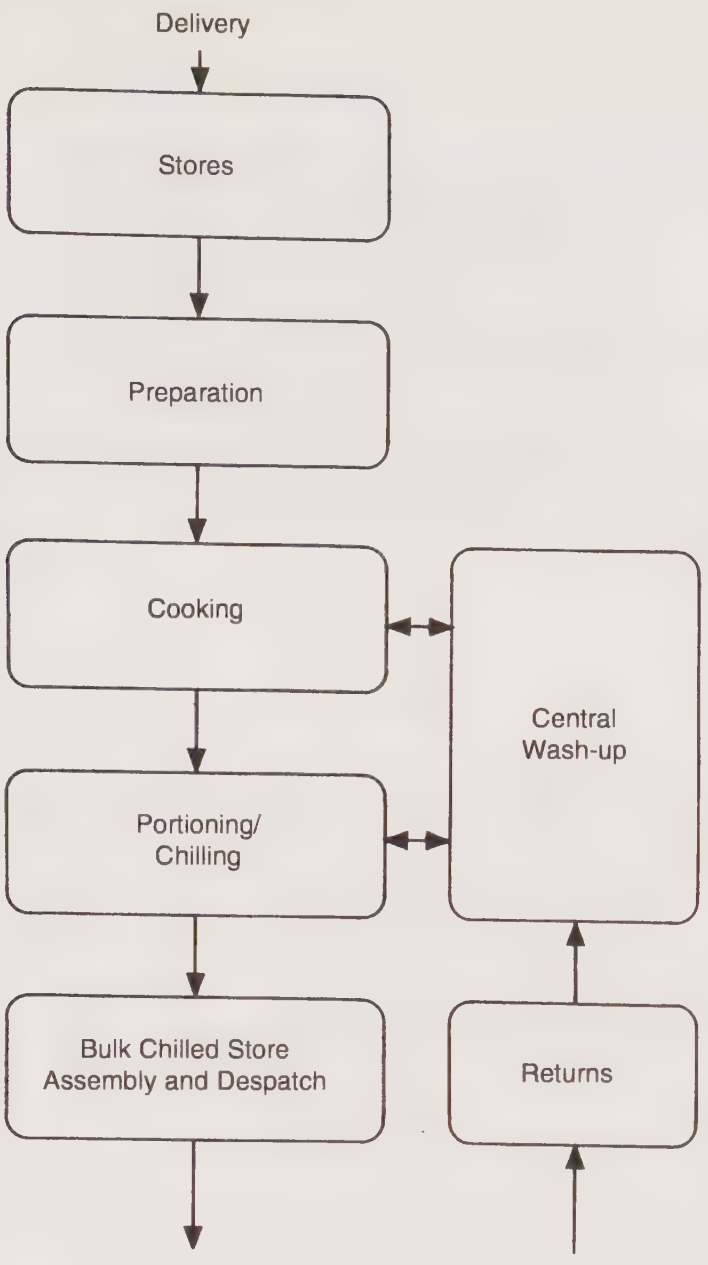


Figure 2 General workflow

Storage

4.6 The dry bulk store should have good access both for deliveries from outside via the loading bay and for the movement of goods to the storage spaces (see Figure 4). The refrigerated stores should be grouped together for economy, energy consumption and ease of maintenance whilst providing a good workflow. Stores related to the preparation areas should have direct access into those areas.

Preparation

4.7 The food preparation rooms must be completely separate from each other and should be adjacent to the cooking area and, where possible, be related to the appropriate cooking equipment. These rooms should be designed to prevent staff passing from one into another. Each of the rooms should be arranged in a clear and simple manner; complicated layouts can create crossflow movements which are a safety hazard. The food after preparation will be portioned into containers, weighed and placed in the pass-through refrigerator sited between these rooms and the cooking area. Dry ingredients enter the cooking area via a transfer lobby.

Cooking

4.8 The layout of cooking equipment within the cooking area is most important for the safe and efficient operation of the CFPU. Different types of cooking equipment may be grouped together to form islands. The selection and grouping of equipment will depend on the project team's decision and the operational policy.

4.9 Each piece of equipment may be connected to its island spine of services. The islands of equipment should be arranged to provide safe and clear passage for staff and trolleys to ensure an efficient operation. Islands of equipment should not be too long to avoid unnecessary walking around by staff. Routes between the islands of equipment should be short and as straight as is possible to ensure the safety of staff using equipment, and there should be sufficient space for staff to move trolleys.

Portioning, chilling, storage areas and despatch

4.10 The portioning area should have direct access via the chillers/freezers to the chilled/frozen food store and despatch (see Figure 5).

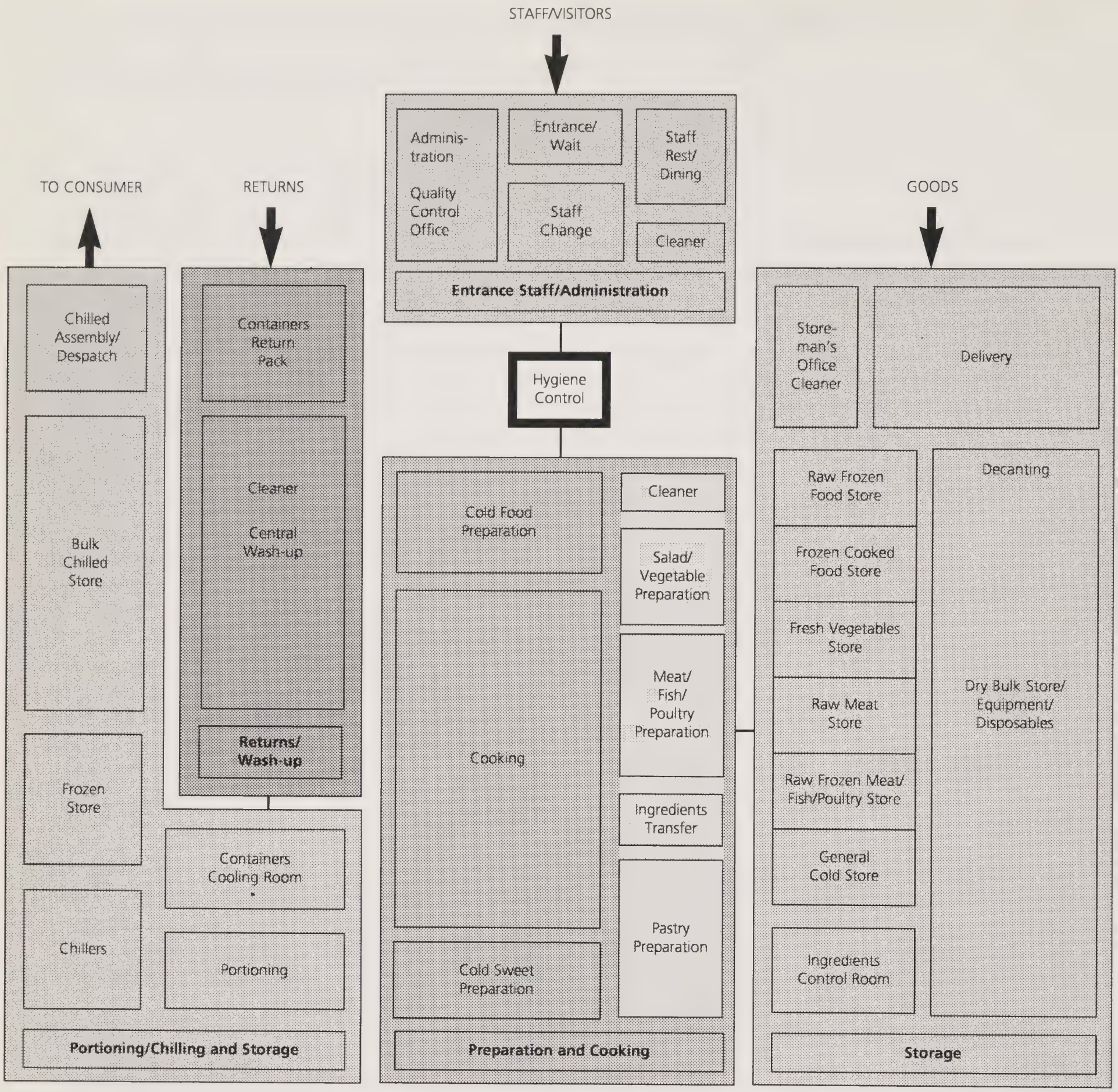


Figure 3 Functional relationships of activity zones within departments

Container returns bay and pre-wash-wash container park

4.11 The boxes containing racks of empty food containers will be unloaded from vehicles in the returns bay and then held in the adjacent parking area to await washing. Principal container workflow is shown in Figure 6.

Central wash-up

4.12 This area is a very busy traffic area, with racks of dirty containers at one end of the area and the clean containers and racks at the other. It is most important to ensure that the workflow separates these functions to prevent cross-contamination. The clean racks and containers will be returned to the preparation cooking and portioning areas for re-use.

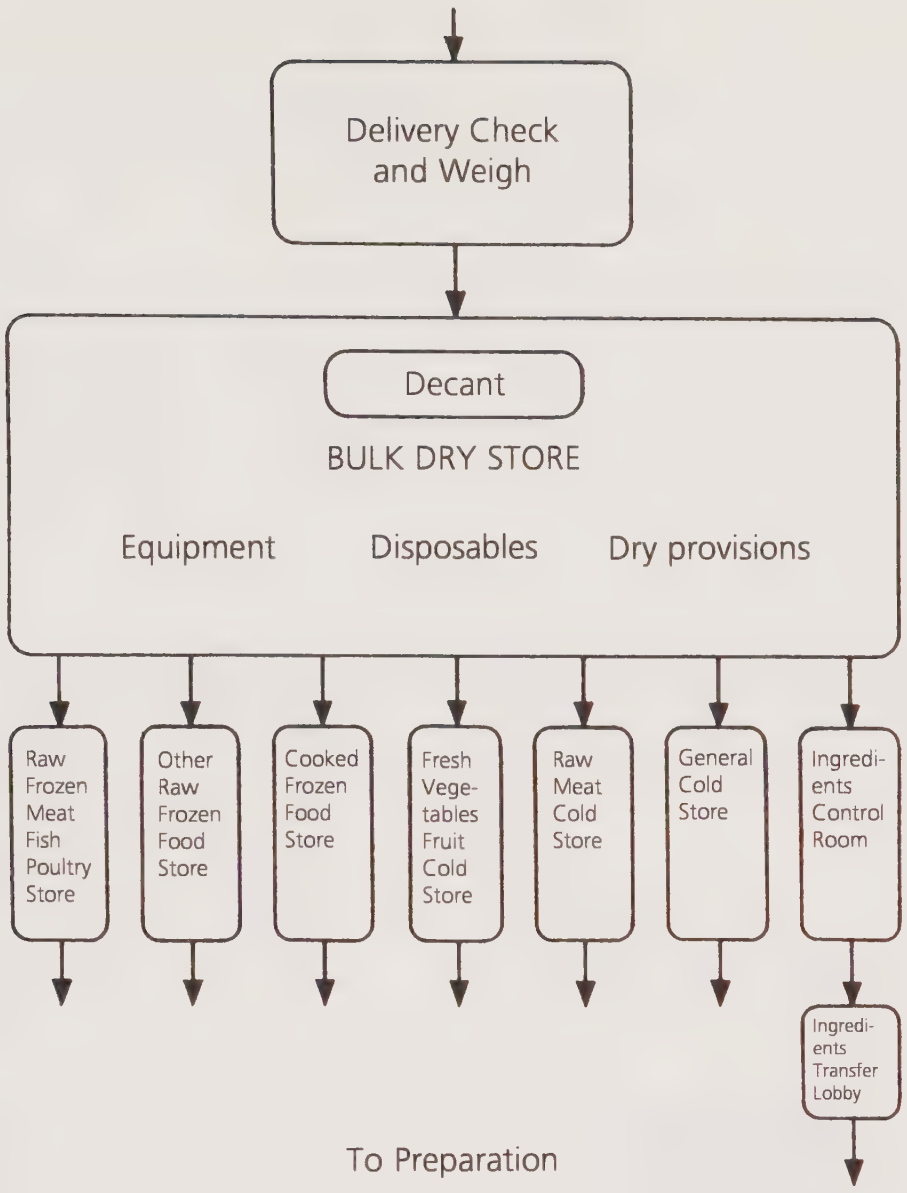


Figure 4 Workflow – stores

Figure 5 Workflow – portioning, chilling and despatch

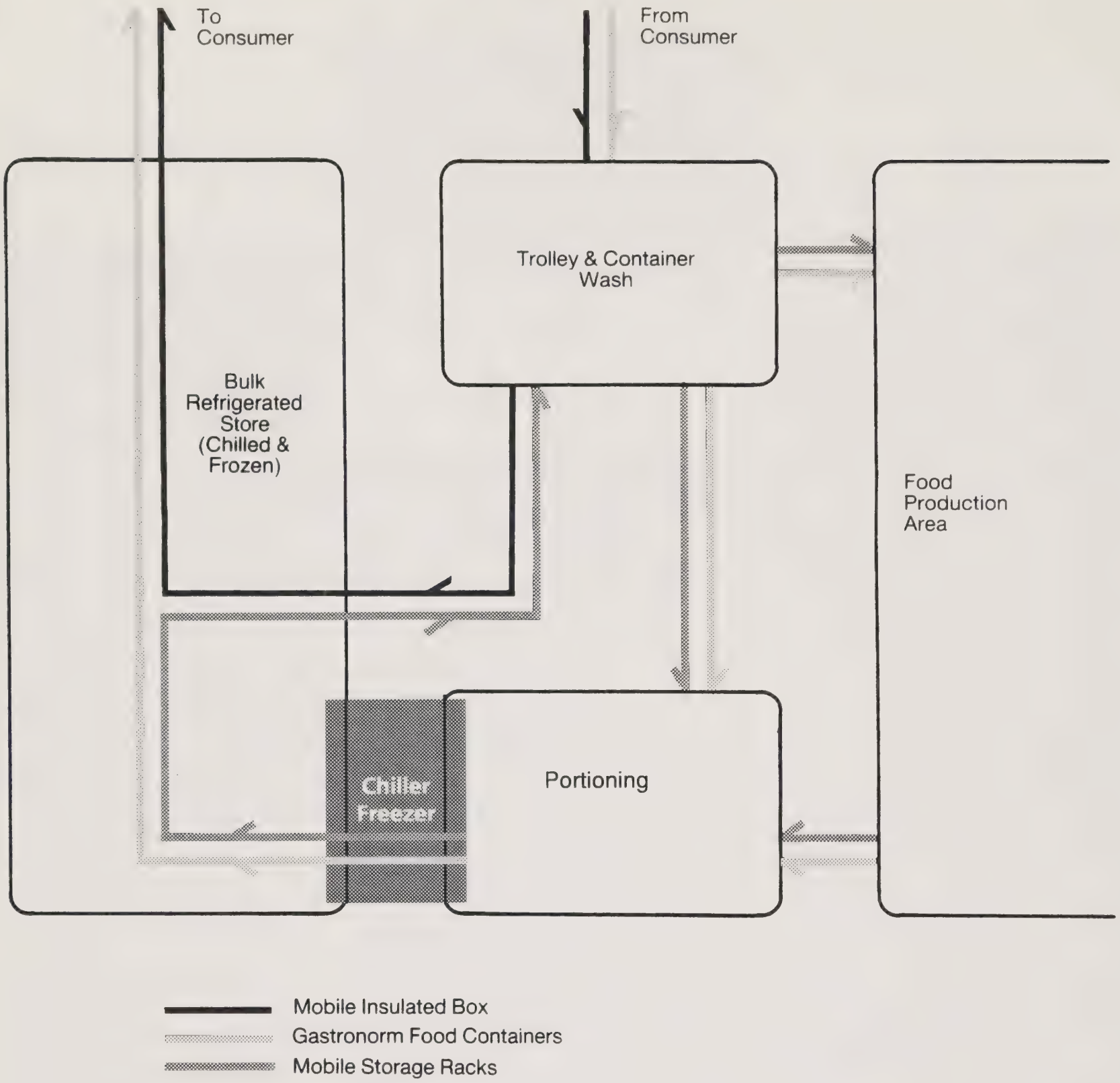


Figure 6 Principal container workflow

DETAILED DESCRIPTION OF SPACES

Delivery area

Delivery bay

4.13 All items essential to the operation of a central food production unit will be received here. A canopy should be provided over the bay for protection against the elements during unloading of vehicles. The bay should have direct level access to the bulk store and associated cold rooms and be on the same floor level to facilitate the use of trucks and pallets. Part of the bay will be for checking and weighing goods on arrival. A mobile platform scale should be provided. A hose reel may be used for the daily cleaning of this bay, and adequate drainage should be provided. The exterior area may be floodlit at night for security reasons. A roller shutter should be provided to secure the bay. Adequate manoeuvring space for large articulated goods vehicles is required. Space for parking the delivery vehicles and power points for these vehicle refrigeration units should be provided.

Drivers' WC

4.14 A separate WC and hand-wash basin should be provided for use by delivery vehicle drivers, sited adjacent to the delivery bay so that drivers do not enter the CFPU.

Empties store

4.15 A separate secure store adjacent to the delivery bay should be provided for holding returnable containers and pallets.

Storekeeper's office

4.16 The storekeeper's office should be sited adjacent to the delivery bay. A clear view from the office window across the delivery bay is essential, to oversee vehicles arriving and for the security of goods on the bay awaiting transfer to stores. A computer terminal should be provided for the storekeeper to enter deliveries and check quantities against requisitions.

Dry bulk store

4.17 The dry bulk store should be adjacent to the delivery bay. Its size should be related to the frequency of deliveries, and the number of days' stock to be held, normally up to 14 days. The area of the store nearest the delivery bay should be designated for decanting items prior to storage, and there should be easy access to the empties store and refuse store. Separate areas should be allocated for dry provisions, equipment and disposable items. All racking should be mobile, and working surfaces of stainless steel. A hand-wash basin and separate sink and drainer should be provided in this area.

4.18 A small area of the bulk store should be set aside for holding a buffer stock of stainless steel containers and lids.

4.19 Space will also be required in the bulk store for holding stocks of disposable items, and for storing stationery, labelling and control/production sheets. Where a disposable packaging system is to be used instead of stainless steel containers, a space capable of holding a minimum of 14 days' production requirements should be provided.

Ingredients control room

4.20 This room should be adjacent to the dry bulk store. It is for the weighing and assembly of the dry provisions required for a day's production. The equipment provided should include a sink and drainer, hand-wash basin, movable benching, mobile storage bins and can-opening machinery. Electronic-type scales with a print-out facility are required. This will enable the ingredients to be checked against the recipes to ensure consistent quality and maintain stock control. Space will be required for the tote bins that hold the weighed ingredients. These will be stacked on mobile bases and wheeled to the adjacent transfer lobby to await collection.

Ingredients transfer lobby

4.21 This lobby should be sited between the ingredients control room and the cooking area. It is the main entry point from the stores for all dry ingredients required in the cooking area. Tote bins will be transferred to the cooking area from this lobby via a hatch which should be specially designed to prevent unauthorised entry by personnel. A bell or intercom system should be installed to alert cooking staff. An observation panel should be sited alongside the hatch.

Cold stores

General

4.22 Separate, designated cold stores should be provided for perishable items. Level, hard-wearing and easy-to-clean floors and walls are required. Floors in cold rooms must be frost-resistant and be insulated or otherwise designed to avoid permafrost in the subsoil. Mobile stainless steel racking is recommended, for storing the containers of food. Thresholds of stores should be flush with the general floor level. All of these stores should be fitted with monitoring and recording thermometers clearly visible on the exterior of the store. They should also be fitted with mains/battery, audiovisual alarm systems to warn if a door mechanism or refrigeration plant fails. The system should also warn if there is a rise in temperature to an unsafe level. An automatic cold-air curtain should be provided to maintain the temperature when the doors are open.

Fats and cheese cold store

4.23 This store is for holding fats, cheese and other dairy products, at a temperature between 0°C and 5°C.

Vegetable cold store

4.24 This store is for holding stocks of fresh vegetables and fruit at a temperature not exceeding 8°C. This store should be sited near to the delivery bay, with a door at one end for deliveries and a door at the other with direct access to the vegetable preparation area.

Raw meat and poultry cold store

4.25 This store is for holding stocks of raw meat and poultry. It should be sited adjacent to its preparation area, with access to the delivery bay. Stainless steel mobile racks will be required. The optimum storage temperature for fresh meat is between minus 1°C and plus 1°C. Frozen meat may be thawed in this room.

Cooked and prepared food cold store

4.26 This store is for holding bought-in, pre-wash-cooked and prepared foods only. The food should be stored at a temperature of between 1°C and 3°C. Raw meat, fish or poultry must not be stored here.

Raw frozen food store

4.27 This store is for uncooked frozen food (excluding meat, poultry and fish). It should be capable of holding sufficient emergency stocks to provide two weeks' production requirements. The temperature should not exceed minus 18°C.

Raw frozen meat, poultry and fish store

4.28 This store is for holding stocks of frozen meat, poultry and fish and should be held at a temperature not exceeding minus 18°C, in separate sections of this store. This Note assumes that raw fish will be purchased frozen. Where fresh fish is to be used, this should be stored in a separate purpose-built unit at a temperature between minus 1°C and plus 1°C.

Frozen pre-wash-cooked food

4.29 This store is for cooked frozen food and should be maintained at a temperature not exceeding minus 18°C.

Hygiene control bay

4.30 This bay should be sited at the entrance to the food preparation rooms. It should be provided with a hand-wash trough, soap, taps, paper towel cassette system and waste bin. The taps and disposable soap dispensers should be non-hand operated.

Food preparation rooms

Introduction

4.31 All staff entering the food preparation area must do so via the hygiene control bay. Preparation rooms must be completely separated from the cooking area.

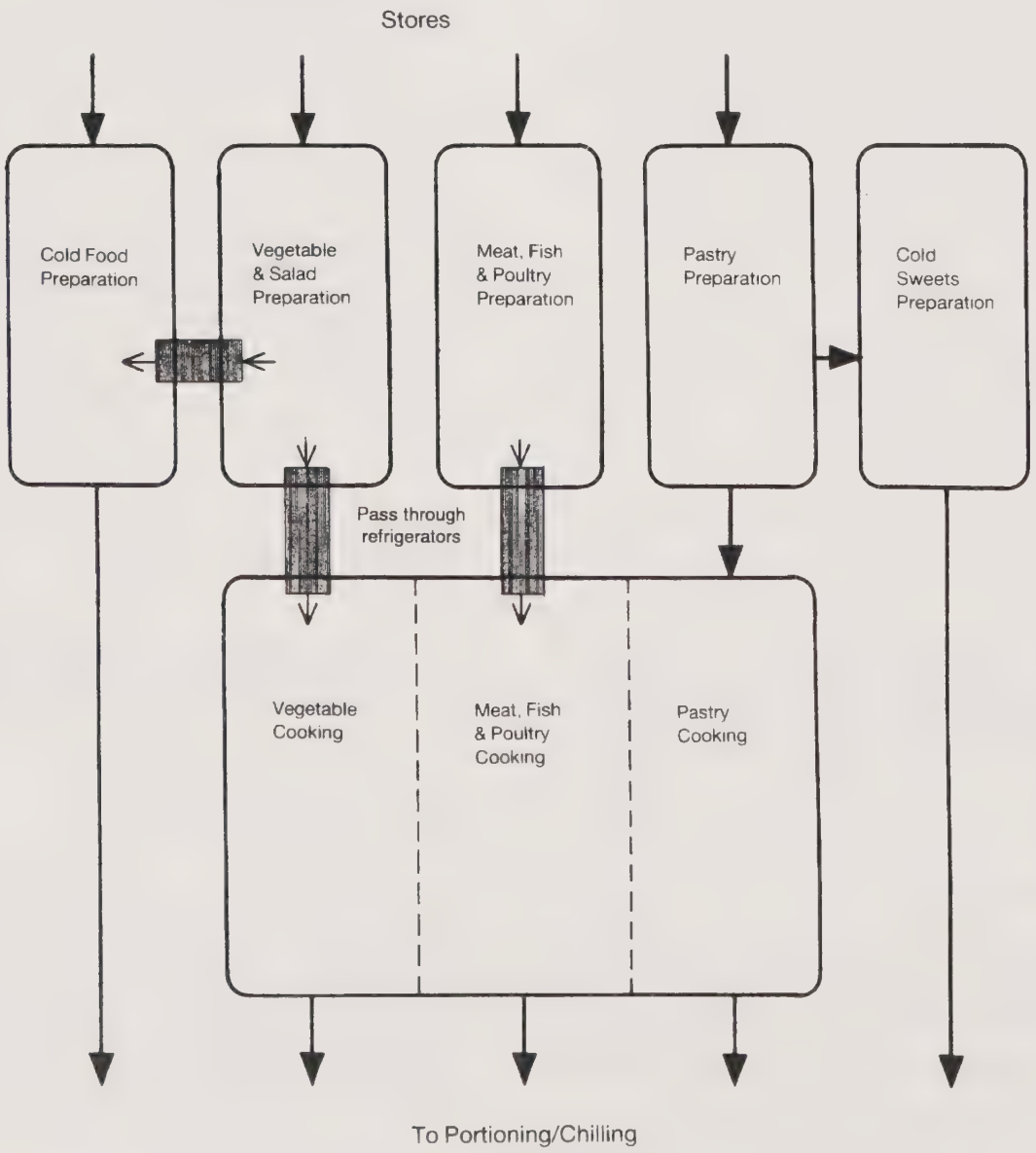


Figure 7 Preparation and cooking

4.32 Separate rooms are provided for preparing raw foods:

a. raw meat, poultry and fish;

b. raw vegetables and fruit;

c. salads and cold foods;

d pastry and hot sweets;

e. cold sweets.

Each preparation room must be sited adjacent to its appropriate store. All sink units provided should be mobile with quick-release bayonet or socket/plug fittings and flexible tubing and drains, to ensure thorough cleansing of the areas. A mobile hand-wash basin with non-hand operated taps should be provided in each room; with hot water at a suitably controlled temperature. To minimise the risk of cross-contamination all utensils, knives and machine parts used in each preparation room should be washed within that area. A utensil washing machine should be provided for that purpose. All chopping boards and knife handles should be colour-coded and used for one function only; for example, red-handled knives and red-coded chopping boards used only for raw meat. See Figure 7.

Raw meat, poultry and fish preparation room

4.33 The raw meat and poultry cold store should be adjacent to this room. This Note assumes that most of the meat will be delivered requiring minimal preparation; therefore, provision for large meat carcass handling equipment is not made. A mincer and slicing machine and weighing equipment will be required. There should be provision for separate worktops and sinks for use in the preparation of each of the raw food items. After preparation the meat, poultry and fish will be weighed, placed in containers and placed in the pass-through refrigerator, which opens into the cooking area.

Vegetables preparation room

4.34 This room is for the preparation of raw vegetables, potatoes, fruit and salads and should be designed to ensure that the workflow is in one direction. Direct access for staff to the chilled vegetable store is at one end, and at the other end, access only for tote bins of prepared food via a pass-through refrigerator to the adjacent cooking area. This is to prevent preparation staff entering the cooking area – so reducing the risk of cross-contamination. The equipment for washing, cleaning and cutting of raw vegetables and fruits will vary according to the amount of pre-wash-prepared vegetables purchased. A salad washer should be provided.

4.35 The vegetable peeling machine, if required, should be sited close to the vegetable store to separate dirty vegetables from the clean area and minimise handling. Peeling machines should be at a suitable height for ease of loading and for discharging peeled vegetables into a shallow sink at a working height for staff to hand-finish. To cut the vegetables to the shape required, a large vegetable mill with an interchangeable range of cutters should be provided. The cutters may be stored on a wall board for ease of access. Weighing equipment should be provided. After preparation the vegetables will be placed into tote boxes or perforated stainless steel containers, weighed, labelled and placed in the pass-through refrigerator which opens into ten cooking areas. Salad items will be placed in a second pass-through refrigerator that opens into the salad/sandwich preparation area.

Salads and cold food preparation room

4.36 This room, which should be maintained at an ambient temperature of not more than 10°C, is for the preparation of salad items, sandwiches, filled rolls and similar food. Worktops should be provided. Equipment should include a slicing machine, weighing machine, wrapping/sealing machines and labelling machines. There should be sufficient space for manoeuvring mobile racks. The sandwiches and rolls will be wrapped and labelled in this room and packed into containers. The salad and vegetable items of food required for the preparation of salads in this room will be collected from the pass-through refrigerator sited between this room and the vegetable preparation room. Cooked items will be delivered directly to the refrigerator in this room. A sink and drainer should be provided.

Pastry and hot sweet preparation room

4.37 This room is for the preparation of pastry and hot sweet items. It should be sited adjacent to the cooking area. The equipment provided will depend on operational policy. This Note assumes that pastry, tarts, pies etc will be produced from raw ingredients. Equipment provided should include mixers, pastry rolling machines, pie/tart stamping machine and dough divider. A proving oven will be needed if yeast products are to be made. A sink and drainer and hand-wash basin should be provided.

Cold sweet preparation room

4.38 This room is for the preparation of cold sweets and should be adjacent to the pastry preparation room. This room should be maintained at a temperature of not more than 10°C. Preparation equipment should include a mixer and a refrigerator. Many of the items will be packed in individual dishes and these will require sufficient worktop space to put them on for decorating and finishing. The finished trays of cold sweets are then loaded onto mobile racks and taken to the chilling/portioning room. Space

should be provided for parking mobile racks. A sink and drainer and hand-wash basin should be provided.

Test and quality assurance kitchen/dietetic advice

4.39 Provision is made for a room for recipe development and ingredient testing prior to their use in the production of chilled meals. Equipment provided includes worktops, storage cupboards, refrigerator, deep-freeze cabinet, sink and drainer, and hand-wash basin.

Hygiene control bay

4.40 This bay should be sited at the entrance to the cooking area and be overlooked by the head chef's office. It should be provided with a stainless steel hand-wash trough, soap, taps, and paper towel cassette system. The taps and disposable soap dispensers should be non-hand operated.

Cooking area

4.41 This area is for the cooking of food in large quantities. Entry to this area must be restricted to designated staff only, who must enter via the hygiene control bay. Wherever possible, layout of cooking equipment should be planned to ensure separation between raw and cooked food. Space between islands of cooking equipment should be sufficient for staff to operate the equipment safely, for others to pass without hazard, and for ease of maintenance and cleaning.

4.42 The equipment selected for the CFPU should be heavy-duty, reliable, and safe to operate. It should be of proven design, comply with BS and EC standards and, where appropriate, be British Council or British Electricity Authorities Bureau (BEAB) approved. Operating instructions should be placed in full view of the operator and the associated switchgear clearly indicated. Safety interlocking devices and gauges should be provided where necessary. The storage, preparation, cooking, chilling, delivery and service equipment chosen should be designed to take the BS standard Gastronorm size stainless steel food containers (BS 4874). The cooking equipment selected should be capable of automatic control using sensors or probes to ensure proper cooking.

4.43 The performance in terms of output of portions per hour and efficiency in the use of energy is very important when selecting equipment for a CFPU. The equipment should be safe to use, easy to clean and, where appropriate, have roll-in racks to minimise handling.

4.44 All worktops, preparation tables and sink units should be mobile and constructed of stainless steel, as should the racking, trolleys and wheel-in racks. These items are mobile to enable the areas to be thoroughly cleansed. Flexible waste services and wall-mounted taps will be required for sink units and hand-wash basins. All wheeled equipment should be fitted with non-marking wheels and have at least two wheels fitted with locking parking brakes.

4.45 It is recommended that individual units rather than suites of cooking equipment should be chosen, as this method is less disruptive to production if a unit has to be removed. Mobile worktops placed alongside cooking equipment will be required; these will also facilitate access to services.

4.46 The cooking area should be divided into five distinct sections:

a. meat, poultry and fish;

b. vegetables;

c. sauces and soups;

d. therapeutic diet food items;

e. hot sweets and pastry dishes.

It should be planned to ensure a good workflow from the adjacent preparation rooms, through to the appropriate cooking equipment and then to the portioning room prior to blast chilling or freezing. Dry ingredients will be collected from the ingredients transfer lobby.

Meat, poultry and fish cooking section

4.47 This section is for the cooking of meat, poultry and fish dishes. The items to be cooked will be collected from the pass-through refrigerators sited between this area and the meat and poultry preparation room. These items will have been pre-wash-weighed and labelled, and will be ready for placing in the appropriate cooking equipment. The cooking equipment provided may include combination ovens, high-pressure steamers, bratt pans, grills and boiling pans.

Vegetable cooking section

4.48 This section is for the cooking of vegetables and vegetable-based dishes. The items will be collected from the pass-through refrigerator sited between this section and the vegetable preparation room. Cooking equipment includes combination ovens, high-pressure steamers, convection ovens, bratt pans, fryers and boiling pans.

Sauces and soups cooking section

4.49 This section is for the preparation and cooking of savoury sauces, gravies and soups. Cooking equipment should include boiling pans and combination cooking and chilling equipment.

Diet cooking section

4.50 This section is for the preparation and cooking of therapeutic diet food. Specialised individual diets may be cooked and portioned in the end kitchen. Equipment required will vary according to needs, but should include a boiling table, convection oven and boiling pans.

Pastry and hot sweet cooking section

4.51 This section should be sited adjacent to the pastry preparation room and is for the cooking of all pastry items and hot sweets. The equipment provided should include convection ovens, pastry ovens, and boiling pans for sauces and milk puddings. Combined cooking and chilling equipment should be provided for sweet sauces. The ovens should be capable of taking wheel-in racks of food to minimise handling. After cooling the racks of food will be wheeled to the portioning and chilling area.

Head chef's office

4.52 The head chef's office should be sited adjacent to the main cooking area. A glazed panel to give a view of staff entering via the hygiene control bay should be provided. A computer terminal should be provided to enable the chef to access recipe files etc.

Portioning room

4.53 This room is provided for portioning, weighing, packaging and labelling the food produced in the CFPU. The room should be cooled to 10°C and be sited between the food cooking area and the chilled and frozen food stores. See Figure 6. The blast chillers and freezers should open into this room. Food will be portioned according to needs into individual or bulk containers and lidded prior to chilling or freezing. Liquid food may be packed in pouches and sealed prior to chilling. Some food such as joints of meat may require pre-wash-chilling prior to slicing and portioning. The containers of food will be checked, weighed and labelled. The printed label should state product, quantity in weight or number of portions, re-heating instructions, date of cooking, use by date, and packer's initial.

4.54 Equipment required includes worktops, electronic scales, label printing machines, vacuum packing sealers and slicing machines. There should be sufficient space for loading and manoeuvring the blast chiller/freezer trolleys and other mobile equipment. A hand-wash basin should be provided. To minimise temperature losses between this room and the adjacent spaces, an automatic sliding door with air curtain should be provided.

Blast chilling and freezing bay

4.55 This bay is provided for the rapid chilling and freezing equipment, and should be sited between the portioning/packaging room and the bulk chilled food and frozen food stores.

The project team should refer to the guidelines indicated in paragraph 1.5, which state:

a. the food should undergo rapid chilling or freezing as soon as possible after the completion of cooking and portioning and in any event within 30 minutes of leaving the cooking equipment;

b. the rapid chillers when fully loaded should be capable of chilling the food to between 0°C and 3°C within a period of 90 minutes. The rapid freezer should be capable of freezing the food to a centre temperature of at least minus 5°C within 90 minutes of entering the blast freezer and should subsequently reach a storage temperature of minus 18°C;

c. the speed of chilling and freezing of food is affected by the following:
   (i) size, shape, weight of food and construction material of the container;
   (ii) food density and moisture content;
   (iii) heat capacity of the food and the container;
   (iv) thermal conductivity of the food;
   (v) the design of the chilling equipment;
   (vi) temperature of the food entering the chiller or freezer;
   (vii) whether the container of food is covered;

d. the two most common methods of chilling and freezing food used in CFPUs are:
   (i) the use of clean, high-velocity recirculating air at low temperature in a mechanical apparatus;
   (ii) the use of cryogenic apparatus involving the use of non-oxidising gas at low temperatures.

4.56 The project team will need to calculate the total weight and type of food to be chilled or frozen and consider which chilling/freezing method will be needed to meet their production requirements.

4.57 This Note assumes that the chilling and freezing of the food produced in the CFPU will be by the mechanical method using pass-through equipment. It is of course feasible to use both mechanical and cryogenic equipment. The cryogenic method, though faster, may not be suitable for all food and may incur higher revenue costs per pound of food; it will also need additional capital cost for the storage vessel and ancillary equipment, and for the separate compound.

4.58 This Note also assumes that the CFPU will operate for eight hours a day, five days per week. Allowing 1fi hours for chilling a full batch of food in a blast chiller, it should be possible to achieve five batches during the day, with one extra batch chilled and held in the chiller overnight giving six batches per day.

4.59 The weight of food in each batch will depend on the capacity of the blast chiller chosen. For example, assuming that it can hold two racks per loading, and that each rack holds 24–30 ˇ 1/1 size shallow containers of food weighing 6–7 lb including container and lids, each rack will hold 150–180 lb, giving a batch of 360 lb per 90 minute cycle.

4.60 To blast-chill 12,000 lb a day would require a minimum of six blast chillers of the above size. Additional allowances will be required for defrosting and servicing the chillers. This example assumes that all the food would be blast-chilled.

4.61 The project team will need to obtain specialist advice to ensure that they provide sufficient chiller and freezer capacity to meet the criteria laid down in the guidelines and their peak production demands.

Bulk chilled food store

4.62 This store is provided for the chilled storage of food on mobile racks. The food is chilled in the adjacent bay. The pass-through blast chillers open into this store. A temperature range of 0°C to 3°C must be maintained. Adequate illumination is essential for staff to read food container labels. There must be sufficient space to allow the mobile racks to be manoeuvred and made ready for despatch according to the meal requirements of the satellite units. Space will also be required for pre-wash-chilling the mobile insulated boxes and containers used for delivering chilled food, and for loading the racks of food into the mobile boxes prior to despatch. This activity will take place in the chilled food assembly area. Power-operated doors with suitable seals are provided at the despatch loading bay end of the store to minimise temperature losses.

4.63 The size of the chilled food store will be determined by the number of units served and by the following:

a. whether one, two or more days' production of food is to be stored, to await despatch. The days chosen to calculate the size should include those on which the maximum quantity of food is produced and stored;

b. the number of mobile racks and mobile insulated boxes and containers required to hold the food requirements for each satellite;

c. the size of mobile racks and mobile insulated boxes and containers chosen. This will affect the area required to park and manoeuvre them within the store and any additional circulation space;

d. the maximum number of insulated containers and boxes which will need to be accommodated for pre-wash-chilling prior to loading with chilled food;

e. the frequency of deliveries required to satellites and the number and capacity of vehicles involved;

f. the quantity of food to be provided for each unit, for example whether food for breakfast as well as lunch and supper is to be provided by the CFPU.

4.64 The air temperature of the store should be continuously monitored by recording apparatus, positioned so as to be clearly visible. It should be checked quarterly for accuracy. The temperature monitor and alarm, both visual and audible, should be monitored from a continuously manned location.

4.65 The compressors should be duplicated, each to be capable of ensuring that the food temperature is maintained within an operational range of 0°C to 3°C.

Frozen meal store

4.66 This store is for holding frozen food and any emergency stock required. A temperature not exceeding minus 18°C should be maintained. This store could be sited within the bulk chilled food store, to minimise temperature losses when manoeuvring racks etc.

Meal despatch

Chilled food assembly area and despatch bay

4.67 Sited adjacent to the bulk chilled food store, this area is where the racks holding the chilled food are gathered for wheeling to the despatch bay. It is maintained at a temperature range of 0°C to 3°C.

4.68 Chilled food is despatched from here to the satellite units. The mobile insulated boxes containing racks of containers may be wheeled from the assembly area straight into the delivery vehicle, via an insulated sectional overhead door with automatic inflatable seal; this fits around the rear of the vehicle to minimise any loss of temperature during loading. A canopy should be provided. A cleaning area and parking space for use by CFPU vehicles may also be required. The area may require to be floodlit at night for security reasons.

CFPU drivers' WC

4.69 A separate WC and hand-wash basin should be provided for use by CFPU delivery drivers; it should be sited as near to the return/unloading bay as possible.

Container returns bay

4.70 This bay is for unloading the mobile insulated boxes from the returning vehicles. A canopy and external lighting should be provided.

Pre-wash-wash container park

4.71 A space is also required for parking the mobile boxes prior to wheeling them to the adjacent central wash-up.

Central wash-up and rack/container wash

4.72 This area is required for washing all the utensils and stainless steel containers used for distributing food. On return from the satellite units they will be put through the purpose-built utensil washing machines. They provide for high temperature washing, rinsing and drying of the containers. Some may have been washed in the satellite unit, but to ensure a high standard of hygiene all the containers should be washed in these machines. Sufficient mobile storage/drying racks will be required for the many containers used in the CFPU. Adequate parking and manoeuvring space is required for racks etc.

4.73 The mobile racks should be washed in the purpose-built rack washer provided. Where a disposable food container system is used, this area may need to be modified. A purpose-built utensil washing machine is also required; this is for washing all the pots, pans and utensils. A hand-wash basin should also be provided. Sinks for pre-wash-washing should be provided as necessary.

Support spaces

Detergent store

4.74 A secure store is required to hold the bulk store of cleaning agents and materials used in the wash-up areas and the general cleaning programme. This store should be dry and well-ventilated, and fitted with shelving, racks, stillages and a banded area for storage of chemicals. A hand-wash basin should be provided for use in the event of product spillage onto personnel. A first aid box and eye wash facilities will also be required. A hose is required for cleaning the floor.

Cleaners' rooms

4.75 A number of cleaners' rooms should be provided, each dedicated to a particular area. These are essential to prevent any cross-contamination from one area to another by cleaning machinery or by cleaning staff; for example, one for cleaning the preparation and storage areas, another for the cooking area, and another for other working areas. The staff accommodation has its own cleaners' room. These rooms will house the floor cleaning and drying machines and ancillary equipment. They should be located adjacent to their designated areas, and each room should be ventilated. In each of these rooms a hand-wash basin should be provided, and a washing/sluice sink for emptying and cleaning the machines.

Clean linen store

4.76 This room will be required for holding clean uniforms. These may be delivered to the CFPU in bulk once a week. Racking should be provided for uniforms and disposable items of clothing which may include gloves, hats, aprons and disposable wear for visitors. Space will be required for storing spare anoraks/thermal wear including thermal footwear used by staff working in the cold rooms.

Dirty linen store

4.77 This room should be provided for holding dirty linen in mobile storage bins prior to packing into laundry bags to await collection. The number of staff, frequency of collection and proportion of disposable clothing used, will affect the size of the store. It will require adequate ventilation.

Switchcupboard

4.78 A switchcupboard housing the main isolators and distribution fuse switchgear should be:

a. accessible directly from a circulation area (access space may be part of the circulation area);

b. sited away from water services;

c. lockable.

3.21 There should be clear and safe access for maintenance staff, and care should be taken to ensure that safety is not compromised, during maintenance, from passing traffic or the opening of adjacent doors.

Gas meter room

4.79 The location must meet the requirements of Part III of the Gas Safety Regulations 1972, particularly Regulations 21 and 22 (Fire risk). It should be sited within

the curtilage of the department and should be easily accessible for isolation of the gas supply and for meter reading.

Water meter

4.80 The water supply should be metered, and facilities for this purpose will normally be located in an external pit, complete with manhole access.

Refuse store

4.81 The allocation of space for food waste and refuse will depend on local waste disposal policies. The refuse store must be separated from the bulk store delivery bay and despatch bay to prevent cross-contamination. There should be no direct access to clean areas. The area should be enclosed and under cover, well-ventilated, rodent- and insect-proof as far as practicable. A pressure hose may be used for cleaning this area, and adequate drainage should therefore be provided. A waste compactor should be provided. Food waste disposal units should be sited in the areas of waste generation. Separate bins may be required to enable recyclable waste items to be held. Waste cooking matter may require a special container. Space in the yard may be required for a large skip/compactor.

Offices and staff accommodation

4.82 All staff and visitors must enter the CFPU through the main entrance. All other entrances to the CFPU should be designed to prohibit the entry of unauthorised staff and visitors. Staff should have direct access solely to the changing areas.

Main entrance and lobby

4.83 The entrance lobby should be provided with a waiting area with seating for visitors. A public telephone may be sited in this area for use by staff and visitors. Where CFPU staff are required to check in, the machine for this may be sited in the lobby. A hatch and window opening into the control clerks' office should be provided so that the clerical staff may contact visitors. The fire alarms and central control board may be sited in the lobby on the wall adjoining the control office.

Manager and assistant manager's office

4.84 An office should be provided for the manager and assistant manager. It should be sited so as to provide a view of the main entrance and access road. The central temperature monitoring and alarm panel should be installed in the manager's office. In addition to the normal office furniture and telephones, computer terminals and associated equipment should be provided.

Control clerks' office

4.85 This office is for clerical staff and should be sited adjacent to the entrance lobby and near to the other offices. A hatch and window should be provided opening into the entrance lobby so that visitors can report to the office staff. A computer terminal should be provided as well as storage cupboards for stationery, computer recording sheets etc.

Quality assurance control office

4.86 The office for the quality assurance control officer will require sufficient space for record storage, computer terminal and associated equipment facilities, and refrigerated storage for food samples prior to despatch to a laboratory. In order to perform certain simple check tests the following equipment will also be required: a small combined refrigerator/freezer; microwave oven for organoleptic testing; a laboratory-type workbench with sink with hot and cold water; an equipment cupboard and a filing cabinet. A hand-wash basin and clothes locker should also be provided. This office may also be used by a microbiologist.

Staff changing rooms

4.87 The staff changing rooms should be completely separated from the central production area to minimise the risk of cross-contamination. Separate staff changing rooms and sanitary facilities will be needed for male and female staff. Sufficient space should be provided to accommodate a locker for each member of staff. Each changing room should have an entrance lobby leading to an area with secure hanging rails for outdoor clothing. Hand-wash basins, bench seating and a mirror will be required, and facilities for staff to shower. WC cubicles, each provided with a hand-wash basin, should be located near the changing room, but must not be within it. Extra hanging space will be required for the warm protective clothing used by staff working in the cold (0°C and 3°C) rooms. Shelving for storing a daily supply of clean uniforms and protective footwear will be required. The footwear should be machine cleaned in the cleaners' room. Space will be required for parking mobile laundry bins.

Staff rest room and beverage bay

4.88 Staff will require a room for use during meal breaks. The room should have windows and, if possible, a pleasant outlook. Lounge seating and dining furniture should be provided.

4.89 A beverage bay, with equipment for holding chilled food and for reheating food, preparing snacks and beverages, and storage for crockery and cutlery, should be provided en-suite to the staff rest room. It should be equipped with a dishwasher and a hand-wash basin.

First-aid room

4.90 A room should be provided for first-aid purposes, furnished with a studio couch, hand-wash basin, chair and first-aid cupboard.

Seminar room

4.91 This room is required for staff training and seminars, and is listed as essential complementary accommodation.

5.0 Distribution and transport from a central food production unit to satellite end kitchens

Introduction

5.1 The distribution system is the most difficult part of the process to control effectively in terms of temperature fluctuations and management of procedures, and is therefore the link in the chain most vulnerable to food contamination and waste. It is essential to ensure that the temperature of chilled food does not exceed 3°C and of frozen food, minus 18°C. Strict control is required to ensure that the correct temperatures are maintained during distribution.

Distribution from the CFPU to the satellite end kitchen

5.2 This Note assumes that the chilled or frozen food will be delivered to the end kitchens either in shallow, stainless steel, lidded, reusable containers or in disposable containers. The containers of food for the end kitchens will be placed on racks in the assembly area of the CFPU food store ready for despatch.

5.3 The mobile racks, holding from 18 to 30 food containers, will then be loaded into large mobile insulated boxes. For small units the containers will be taken off the racks and put into small stackable insulated boxes capable of holding from three to six containers. For ease of movement these small boxes may be stacked onto mobile bases or dollies.

5.4 The orders for each end kitchen will be wheeled to the despatch bay in their insulated boxes and loaded into the delivery vehicle.

5.5 To ensure that the temperature of the chilled food does not exceed 3°C and that of frozen food minus 18°C during distribution, the recommended method of delivery is by purpose-built refrigerated vehicle.

Reception of chilled food from CFPU

5.6 On arrival at the end kitchen the mobile insulated boxes containing mobile racks of food containers will be wheeled directly from the delivery vehicle into the end kitchen's chilled food store or frozen food store, and parked in the decanting and checking area of the store.

5.7 The mobile racks will be unloaded from their insulated boxes and the containers of food checked for temperature, quality and quantity. The mobile racks of food containers will be parked in the appropriate area of the store designated for that day's meals. The empty mobile insulated boxes will be parked in the returns bay to await collection and return to the CFPU with their racks of empty food containers and lids.

5.8 The delivery vehicle will return to the CFPU to be unloaded at the returns bay. The large insulated mobile boxes with their racks of empty reusable food containers, and the small insulated boxes, will be unloaded and held in the parking area provided. They will later be wheeled to the central wash-up for emptying and cleaning.

5.9 The despatch and returns bays should be provided with external lighting. Power sockets may be required for vehicle refrigeration units.

5.10 Vehicle washing facilities and a secure parking area/yard will be required for the CFPU's delivery vehicles.

6.0 Service and general functional and design requirements for satellite end kitchens

Introduction

6.1 This chapter provides guidance on the functional requirements and design implications for each of the activity spaces required in a satellite "end kitchen". The purpose-built end kitchen may receive chilled food from a central food production unit (CFPU) or from commercial sources.

Workflow

6.2 The organisation of the various processes should be as indicated in Figure 8.

Workload

6.3 Guidance is given for two sizes of end kitchen for an acute hospital serving:

a. 600 midday meals (300 beds and *300 staff midday meals);

b. 1200 midday meals (600 beds and *600 staff midday meals).

*These ratios of staff to patients' midday meals will vary from unit to unit.

Location

6.4 End kitchens may be located on hospital sites or those of other users. They should be at ground level for easy access by delivery vehicles, and each must have its own food delivery bay, not shared with any other function. The end kitchen should have an enclosed and direct connection to the main hospital corridor. The staff restaurant should be adjacent to the staff meal service room. Other locations may be necessitated by local circumstances, but ground-level locations are the most economic and convenient. End kitchens are high fire-risk departments and should be located away from areas of high life-risk; there should be good access for fire-fighting appliances. End kitchens should not be located where they may be exposed to airborne or waterborne contaminated effluent; air-handling plant and drainage systems must be designed to exclude this possibility.

Inclusions

6.5 The following areas are required to form a purpose-built end kitchen for both sizes. They are described in detail later in the following chapter.

a. stores:
   - (i) reception and delivery bay;
   - (ii) store-keeper's office;
   - (iii) provisions and general store;
   - (iv) bread store;
   - (v) bulk chilled food store;
   - (vi) milk cold store;
   - (vii) general cold store;
   - (viii) frozen food store;
   - (ix) diet store;
   - (x) linen stores, clean and dirty;
   - (xi) returns bay parking area for CFPU containers etc;
   - (xii) empty returns stores;
   - (xiii) refuse store;

b. preparation rooms:
   - (i) hygiene control bay;
   - (ii) salad and cold food preparation room;
   - (iii) diet preparation, cooking and chilling room;
   - (iv) patients' food service preparation room;
   - (v) patients' food service trolley park;

c. staff food service room:
   - (i) cooking and reheating area for staff food, functions and for feeding patients in an emergency;

d. washing-up and cleaning:
   - (i) central wash-up including pot-wash;
   - (ii) trolley wash;
   - (iii) cleaners' room;
   - (iv) detergent store;

e. offices and staff accommodation:
   - (i) unit catering manager's office;
   - (ii) male and female changing rooms;
   - (iii) staff rest room.

Exclusions

6.6 Although this Note excludes detailed advice on the conversion or adaptation of existing conventional kitchens, the guidance may be applied at a conceptual level.

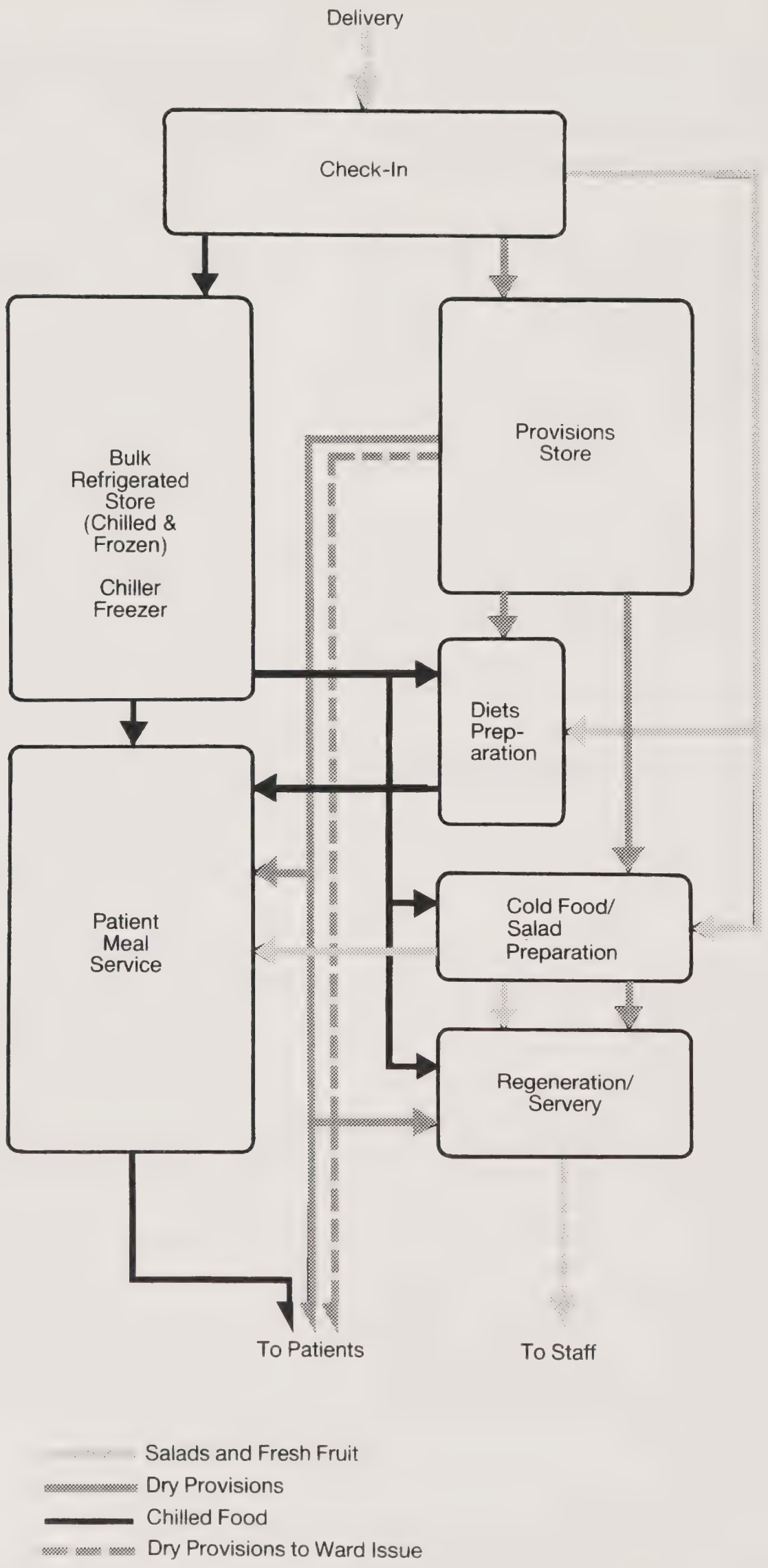


Figure 8 General workflow

7.0 Specific functional and design requirements for satellite end kitchens

7.1 This chapter provides detailed guidance on each of the activity spaces required in an end kitchen. Functional relationships of principal spaces within the unit are shown in Figure 9.

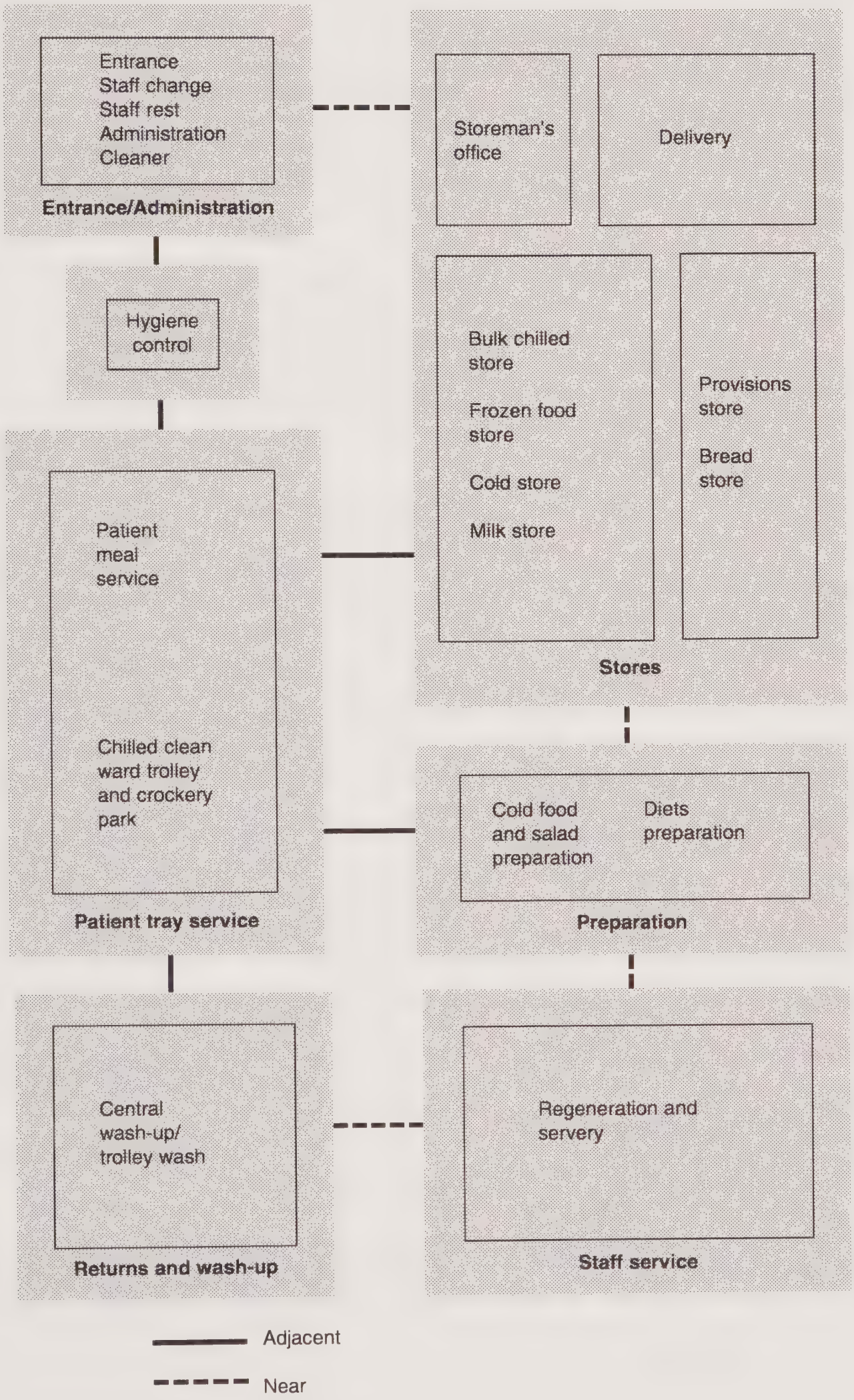


Figure 9 Functional relationships of action zones within departments

Delivery area

Delivery bay

7.2 This area is provided for the reception and checking-in of chilled and frozen food received from the CFPU or other sources, and for dry provisions and other catering items. It should be sited adjacent to the bulk chilled food store. Suitable access will be required to enable the CFPU vehicle to manoeuvre and unload the mobile insulated boxes of food. A bell should be provided to enable the delivery driver to receive assistance in unloading the boxes of food as quickly as possible. These boxes of food must not be left on the bay. Suitable protection from the elements should be provided over the bay and rear of the delivery vehicle. A hose reel and drain should be provided. Mobile scales for checking incoming provisions will be required.

Storekeeper's office

7.3 This office should be sited adjacent to the delivery bay, with windows overlooking the bay and delivery yard. A small hatch opening onto the bay will be required. A computer terminal should be provided.

Empty returns store

7.4 This store is provided for the secure holding of returnable charged containers and pallets. It should be sited adjacent to the delivery bay.

CFPU returns bay

7.5 This bay is provided for the secure holding of the CFPU mobile insulated boxes. These boxes will have been reloaded with their mobile racks of empty food containers and parked here to await collection. The bay should be sited adjacent to the delivery bay.

Stores

Provisions store

7.6 This store is provided for dry provisions and other catering items required for wards and staff dining areas, with facilities for weighing food and space for filling and holding ward containers. Refrigerators are provided for fat and cheeses, and other dairy products. Adequate stainless steel racking for provisions, disposables, equipment and crockery is also provided. This store combines the functions of the chefs' day-to-day store and equipment and disposables stores of a conventional kitchen.

Bread store

7.7 This store is provided for holding bread and cakes. It should be well ventilated. The store may be sited adjacent to and with access from the bulk provisions store.

Diet food store

7.8 A small secure store should be provided sited adjacent to the diet preparation bay and near to the bulk provisions store.

Dairy products cold store

7.9 This refrigerated room is provided for storing fresh milk and dairy products at a temperature range of 0°C to 5°C.

Frozen food store

7.10 This store is provided for holding frozen food for day-to-day use and a reserve stock for use in an emergency. The temperature should not exceed minus 18°C.

Bulk chilled food store

7.11 This refrigerated store is provided for holding two to three days' (see Table 2) supply of chilled food on mobile racks within a temperature range of 0°C to 3°C. There should be adequate space to manoeuvre the boxes, racks and other trolleys inside the store. An exterior-mounted recording thermometer and audiovisual alarm system should be provided. This should be connected to a continuously staffed location so as to alert to any rise in temperature or staff trapped inside. A space within the store should be designated for decanting the mobile racks of food containers from inside the mobile insulated boxes. The checking of chilled food in the containers for temperature and quantity will also be carried out here prior to wheeling the rack into its designated parking space. This may be specified for a day or a meal. The empty insulated mobile boxes will be taken out and parked in the returns bay. The bulk chilled food store should be sited adjacent to the delivery bay, and to the patients' food service area.

General cold store

7.12 A cold store, with a temperature not exceeding 8°C, is required for holding raw fresh fruit and salad items. Some items may be supplied pre-wash-prepared by the CFPU.

Day	Food for day/meal received from CFPU or other source	Food for day/meal held in chilled food store overnight	Meal served
Monday	Tuesday – Lunch Tuesday – Supper	Tuesday – Lunch Tuesday – Supper	Monday – Lunch Monday – Supper
Total Meals	2	2	2
Tuesday	Wednesday – Lunch Wednesday – Supper Thursday – Lunch	Wednesday – Lunch Wednesday – Supper Thursday – Lunch	Tuesday – Lunch Tuesday – Supper
Total Meals	3	3	2
Wednesday	Thursday – Supper Friday – Lunch Friday – Supper	Thursday – Lunch Thursday – Supper Friday – Lunch Friday – Supper	Wednesday – Lunch Wednesday – Supper
Total Meals	3	4	2
Thursday	Saturday – Lunch Saturday – Supper Sunday – Lunch	Friday – Lunch Friday – Supper Saturday – Lunch Saturday – Supper Sunday – Lunch	Thursday – Lunch Thursday – Supper
Total Meals	3	5	2
Friday	Sunday – Supper Monday – Lunch Monday – Supper	Saturday – Lunch Saturday – Supper Sunday – Lunch Sunday – Supper Monday – Lunch Monday – Supper	Friday – Lunch Friday – Supper
Total Meals	3	6	2
Saturday	NIL	Sunday – Lunch Sunday – Supper Monday – Lunch Monday – Supper	Saturday – Lunch Saturday – Supper
Total Meals	0	4	2
Sunday	NIL	Monday – Lunch Monday – Supper	Sunday – Lunch Sunday – Supper
Total Meals	0	2	2

Table 2 Number of meals received, held and served in an end kitchen

Hygiene control bay

7.13 The hygiene control bay should be sited at the entrance to the patients' food service room and be overlooked by the manager's office. The bay should be provided with a hand-wash trough, soap and paper towel cassette system. The taps and soap dispensers should be non-hand operated.

Food preparation rooms

Salad and cold food preparation room

7.14 A room, cooled to 10°C, should be provided for the preparation of salads, sandwiches and rolls. Adequate worktop space and equipment including a gravity food slicer for cooked meats, salad washer, vegetable mill, double sink, refrigerator and hand-wash basin are required. Preferably, this room should be sited near to the patients' food service area, diet bay and restaurant servery. Alternatively, the rolls, sandwiches and pre-washed salad ingredients may be supplied from the CFPU or other sources depending on local policy, in which case some items of preparation equipment may not be required.

Diet preparation and cooking room

7.15 A small self-contained diet kitchen is required for the preparation, cooking, portioning and chilling of patients' diet food requirements that cannot be supplied by the CFPU. The need for this room will depend on local requirements. Equipment should be provided to cater for the small number of diets likely to be required. It should include a range with boiling top and oven, grill, small fryer and a steaming oven. To ensure that the temperature of the diet food is compatible with the patients' chilled food service, a small table-top blast chiller is required. The diet food would be taken to the patients' food service room and loaded into the appropriate ward trolley. Worktop space for preparing and portioning diets, and an undercounter refrigerator and deep freeze, are also required. A hand-wash basin and sink unit will be

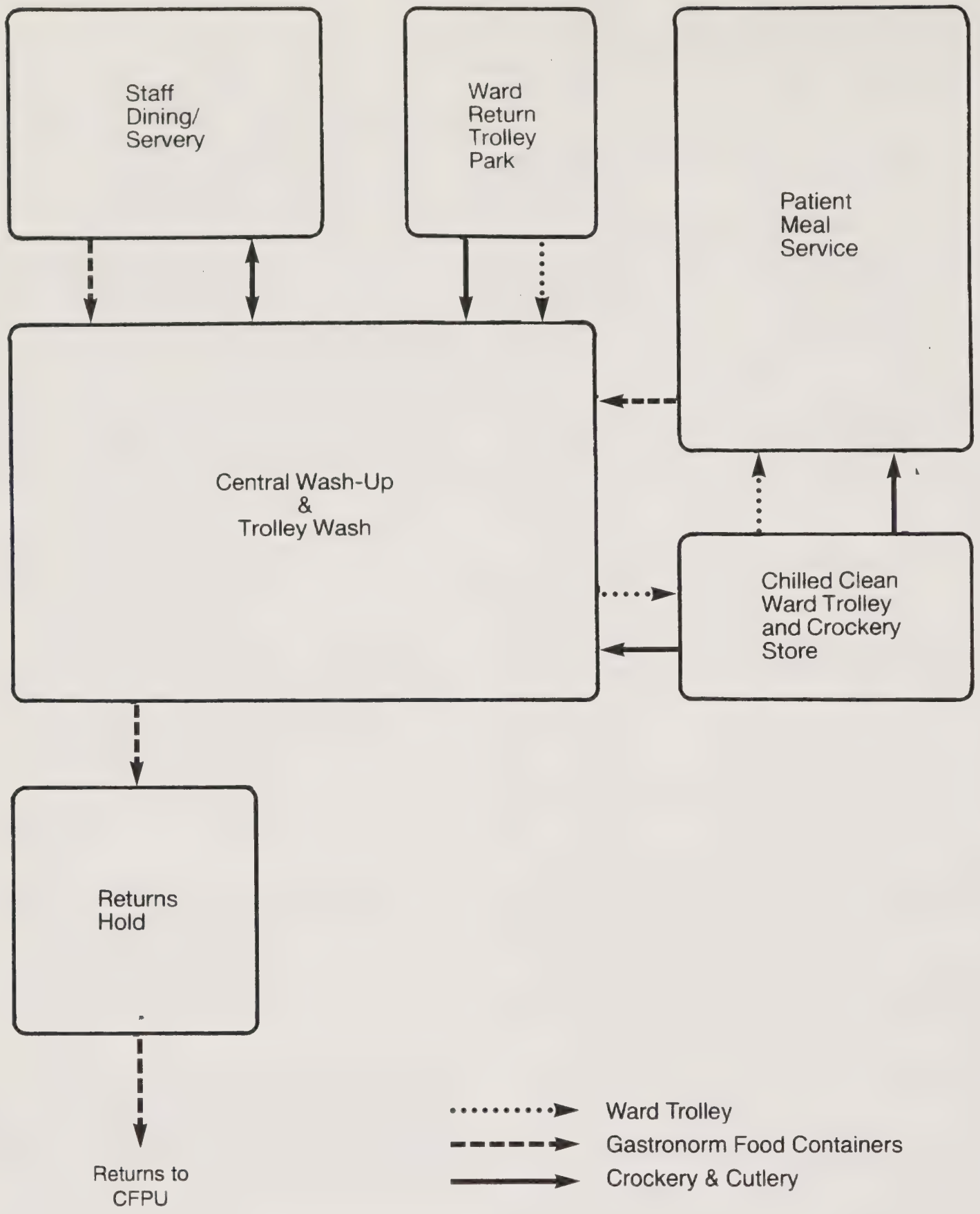


Figure 10 Wash-up workflow

required. It may also be necessary to provide a means of labelling diet foods. The diet kitchen should be sited adjacent to the diet food store and near to the patients' food service room.

Meal despatch

Patients' food service room

7.16 This cooled room is required for the assembly of patients' meals to their individual requirements. The room temperature should not exceed 10°C. It should be sited adjacent to the bulk chilled food store and ward trolley bay. Staff access to this room should be restricted to designated staff only. They should enter via the hygiene control bay provided. In addition to the usual protective clothing, anoraks or thermal wear may be required for these staff.

7.17 The mobile racks holding containers of chilled food required for a meal will be wheeled from the adjacent bulk chilled food store. The containers of food will be unloaded from the racks and placed in designated mobile service units sited around the conveyor belt. The chilled food will be portioned on to pre-wash-chilled plates that have been held in the chilled food store, then loaded into

the ward trolley with accompanying trays, cutlery etc. Where there is a requirement for a bulk chilled meal service, the containers of chilled food will also be portioned in this room and loaded into pre-wash-chilled bulk service ward trolleys. Adequate space should be provided for parking and manoeuvring the plate dispensers, mobile racks and trolleys. In addition to the conveyor belt and service units, a refrigerator, deep-freeze cabinet, sink and drainer, and hand-wash basin will be required. To facilitate the cleaning of this room, the conveyor belt should be mobile and have lockable wheels.

7.18 To minimise temperature losses between this room and the corridors, automatic sliding doors with a cold-air curtain should be provided. The entrances may be personnel card-operated to restrict entry to authorised staff only.

Clean ward trolley room

7.19 This cooled room is provided for holding and pre-wash-chilling the patients' food service trolleys. It should be adjacent to the patients' food service area and should be maintained at a temperature at or below 10°C. To maintain this temperature, access from the central wash-up should be via automatic sliding doors with a cold-air curtain. Adequate space will be required for holding and manoeuvring ward trolleys and mobile plate-dispensers.

Staff food service room

7.20 This room is for cooking and for the bulk reheating of chilled and frozen food for staff, visitors and functions. It may also be used for providing food for patients' meals in an emergency, using frozen food from the frozen food store (see paragraph 7.10). It should be sited adjacent to the staff restaurant/servery and the salad/cold food preparation area. The cooking equipment provided should include combination ovens, fryers, grills and steamer. A chilled food cabinet of sufficient size to hold food for a peak midday meal should be provided. Chilled food will be collected from the chilled food store in a mobile insulated box. Space will be required for manoeuvring boxes, racks and trolleys and worktop space for finishing items prior to service. A hand-wash basin should be provided. The reheated food for staff may be placed in the pass-through hot cupboard provided sited between this area and the rear of the staff restaurant servery, or taken into the servery or function room by insulated heated trolley.

Return ward trolley park

7.21 This park is provided for patients' food service trolleys on their return from the wards prior to unloading, stripping and washing in the central wash-up. It should be sited adjacent to the central wash-up.

Central wash-up

7.22 All the crockery, cutlery and trays used for the service of meals to patients and staff will be washed in this area. It should be sited adjacent to the return ward trolley park and staff dining area. The equipment provided should include two flight-type dishwashers. A stripping system incorporating a food waste disposal unit is required at the loading end (it may be necessary to obtain the agreement of the local water company before installation). Space will also be required for parking the ward and restaurant clearing trolleys prior to unloading, and for manoeuvring them. All empty food containers from the CFPU should be pre-wash-washed in the dishwasher before they are returned. A hand-wash basin should be provided. The trolley wash and pot wash are also sited within this area (see Figure 10).

Trolley wash bay

7.23 A trolley wash bay is provided for cleaning the ward food trolleys and dining-room clearing trolleys and other mobile equipment. A shower curtain should be provided, and the floor of this area will need a drain.

Pot wash bay

7.24 This bay is for washing pots, pans and serving utensils used in food service areas, and is equipped with a utensil washing machine, sink drainer and tabling.

Support spaces

Detergent store

7.25 A secure store is required to hold the bulk stock of cleaning agents and materials used in the wash-up areas and the end kitchen general cleaning programme. This store should be dry and well ventilated and fitted with shelving, racks, stillages and a banded area for the storage of chemicals. A hand-wash basin should be provided in the event of product spillage onto personnel. A first-aid box with emergency eyecare items will be required in this area.

Cleaners' room

7.26 This room is required for storage and cleaning of cleaning materials and equipment. Facilities provided should include a cleaners' sluice sink and drainer, equipment cupboard, hanging rack and a hand-wash basin.

Clean linen/uniform store

7.27 This room is provided for the storage of clean staff uniforms and disposable protective clothing. It is essential that sufficient space is provided to ensure that staff have a change of clothing daily, and for supplying protective clothing to visitors to the unit. The thermal wear or anoraks used by food handlers in the cold rooms may also be held in here. These may be issued daily.

Dirty linen/uniform store

7.28 This room is for holding mobile laundry bins of soiled uniforms awaiting collection.

Switchcupboard

7.29 A departmental switchcupboard housing the main isolators and distribution fuse switchgear should be:

a. accessible directly from a circulation area (access space may be part of the circulation area);

b. sited away from water services;

c. lockable.

There should be clear and safe access for maintenance staff, and care should be taken to ensure that safety is not compromised, during maintenance, by passing traffic or the opening of adjacent doors.

Gas meter room

7.30 The location must meet the requirements of Part III of the Gas Safety Regulations 1972, particularly Regulations 21 and 22 (Fire risk). It should be sited within the curtilage of the department and should be easily accessible for isolation of the gas supply and for meter reading.

Refuse store

7.31 This store is provided for holding and compacting packaging materials and other waste from the unit. The store should be completely separate from the delivery bay and should be an enclosed space to prevent vermin and pest infestation as far as practicable. This Note assumes that food waste from the meal service points, and any unserved chilled food at the end of each meal, will be disposed of in the food waste unit in the central wash-up. The store should be equipped with a waste compactor and a hose reel for washing down the area. Space may be required in the adjacent yard for a local authority bin or skip depending on local policy. A hand-wash basin should be provided.

Offices and staff accommodation

Entrance lobby

7.32 An entrance lobby for staff and visitors is required, with seating space for visitors to wait. A public telephone should be provided. The staff check-in facility may also be sited in the lobby. The entrance should be adjacent to the catering manager's office. A window and hatch should be provided in the wall between this office and the lobby.

Catering manager's office

7.33 This office is provided for the catering manager and should be sited adjacent to the main entrance lobby and opposite the hygiene control bay entrance to the patients' food service room. Windows should be provided to enable the manager to oversee both these areas. In addition to the normal office furniture and telephone, the manager should be provided with a computer terminal and associated equipment which may be linked to the CFPU computer.

Staff changing room

7.34 Separate staff changing rooms and sanitary facilities will be needed for male and female staff, with sufficient space to accommodate a locker for each member of staff. Each changing room should have an entrance lobby leading to an area with secure hanging rails for outdoor clothing. In this room staff change from outdoor clothing into protective clothing. A daily supply of clean uniforms will be required. The inclusion of WCs with hand-wash basins in the changing room is not acceptable: they should be located in an adjacent space. Facilities should be provided for staff to shower. Space will also be required for parking mobile laundry bins.

7.35 The environmental requirements of the Offices, Shops and Railway Premises Act 1963 will apply, and reference should also be made to HBN 41 – 'Accommodation for staff changing and storage of uniforms'.

Staff rest room

7.36 A separate room with natural light and a pleasant outlook should be provided for catering staff to use during rest periods. It should be decorated with domestic-style furnishings, for example carpets, curtains, and lounge-type seating with low tables. This Note assumes that catering staff requiring meals will use the hospital staff dining and coffee areas provided.

8.0 Patients' food service systems

8.1 The figures and notes which follow describe two types of food service system, together with a number of variations, from an end kitchen to the point of consumption by the patient. One system is based on a tray service, where individual patients' chilled meals are assembled on to pre-wash-chilled plates and loaded with their trays into refrigerated ward trolleys in the patients' food service room and then transported to the ward pantry still under refrigeration. The second is based on the supply of chilled food to the ward pantry from the patients' food service room in bulk food containers. The bulk food containers are reheated in the ward pantry and individual meals are laid up onto trays and served at the patients' bedside, or ward dining area. They may also be served from a cafeteria counter for ambulatory patients.

8.2 In principle, all alternative ways of managing the service and presentation of meals, using cook-chill production methods, are based on one or other of these systems. The type of equipment chosen has a major effect on space requirements, hygiene management and staff requirements. It is essential therefore that project teams planning the meal service ensure that equipment, space provision and management systems match.

8.3 The ward pantry is the last link in the food service chain before meals are eaten. A failure at this point in hygiene and microbiological control, for example failing to monitor food core temperatures properly, may result in serving potentially dangerous food to patients. Rooms must be of adequate size for the food service equipment and for the service procedures required. This is to ensure the proper performance of the system selected.

8.4 Each of the system variations outlined in Figures 11 to 14 uses proprietary food service equipment: some include a complete set of items, others only a distribution trolley. The mobile equipment required to implement the systems is often bulky and heavy to manoeuvre. It may require special electrical services. Storage and trolley parking is required at various points. Mechanical washing-up and crockery storage may be required in the ward pantry for some of these systems.

8.5 In addition to the chilled food service, and its needs as to space and equipment, continental breakfasts may be prepared in the ward pantry. Beverages are an essential part of the food service and must also be available to patients at times other than main meals. These are also prepared in the ward pantry.

8.6 Thus, in addition to the major items of equipment associated with the service of main meals, additional equipment may be required for refrigerated food storage, washing-up after meals, storage of crockery and cutlery, and beverage preparations in the ward pantry.

8.7 In order to simplify the presentation of currently available systems and their variations, the figures have two components:

a. the order of events from the reception of chilled food from the CFPU to the point of consumption by patients is portrayed graphically for the two systems together with variations;

b. associated with many of the events, a letter A, B, C etc indicates that alternative items of equipment are available currently. Alternative logistics are also presented graphically.

8.8 Figures 12 and 14 describe the item of equipment referred to. Since new items of equipment are constantly under development, project teams will want to refer to all sources of information, including the latest trade literature, at the appropriate time to ensure that their plans relate sensibly to the requirements of the service systems.

Distribution of trolleys from the end kitchen to patients' food service areas

8.9 The trolleys of chilled food, of whatever type, may be delivered to the wards and day hospital by using one of the methods available, for example:

a. individual trolleys guided manually to the ward. This may be preferred where distances are short or where there is a lift from the catering department to wards. The size and loading capacity of the lift car should be considered when selecting chilled meal trolleys;

b. several trolleys towed by an electric tug. Because of the size and weight of chilled meal trolleys the number towed may have to be limited. Adequate space will be required in the end kitchen to enable the tug to manoeuvre when collecting or delivering trolleys. If a dedicated tug is used, a parking space and battery charging facilities will be required;

c. loaded onto a purpose-built box-trailer capable of holding two to four trolleys and towed by tug or motor vehicle. This system may have to be used where the delivery to units has to be made along roads unsuitable for a tug towing several trolleys;

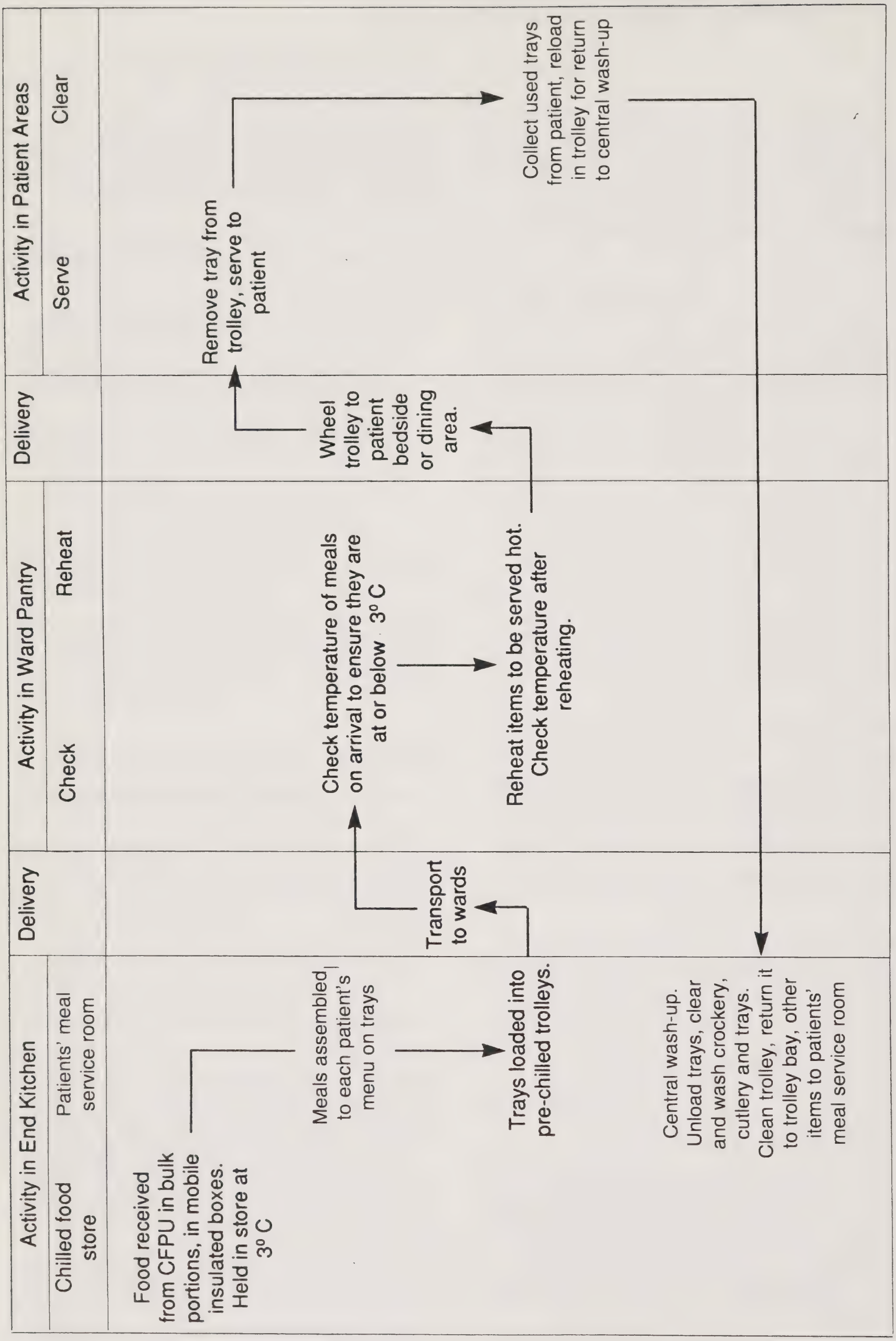
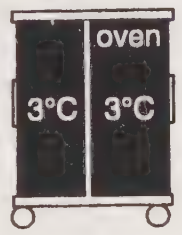
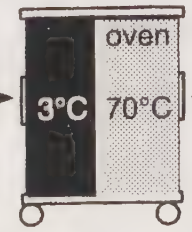
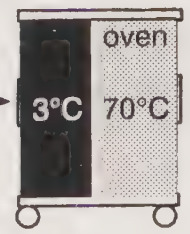
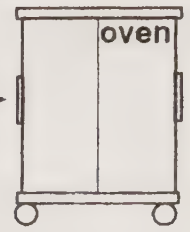
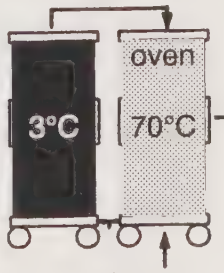
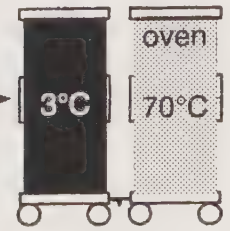
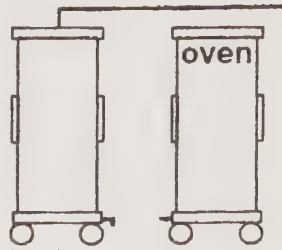
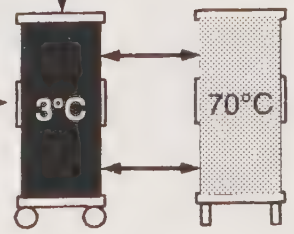
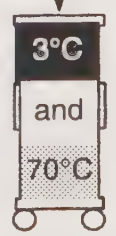
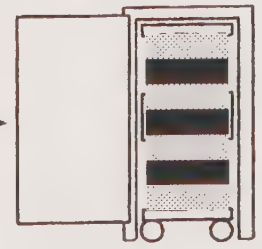

Activity in End Kitchen
Chilled food store
Patients' meal service room
Delivery
Activity in Ward Pantry
Reheat
Check
Activity in Patient Areas
Serve
Clear
Food received from CFPU in bulk portions, in mobile insulated boxes. Held in store at 3° C
Meals assembled to each patient's menu on trays
Trays loaded into pre-chilled trolleys.
Transport to wards
Check temperature of meals on arrival to ensure they are at or below 3° C
Reheat items to be served hot. Check temperature after reheating.
Wheel trolley to patient bedside or dining area.
Remove tray from trolley, serve to patient
Collect used trays from patient, reload in trolley for return to central wash-up
Central wash-up. Unload trays, clear and wash crockery, cutlery and trays. Clean trolley, return it to trolley bay, other items to patients' meal service room

Figure 11 Methods of distribution – 1. Tray service

Example	Activity in End Kitchen		Delivery	Activity in Ward Pantry	Delivery	Activity in Patient Areas (Patient bedside or dining area)	
	Chilled food store	Patients' meal service room				Serve	Clear
A. Combined oven and delivery trolley	Pre-chill trolley in trolley bay	 Assemble meal and load into trolley		 check temperatures on arrival and after reheating		 remove tray, add hot items from oven, serve to patient	 reload trays in trolley
B. Separate delivery trolley, coupled to mobile oven unit in ward kitchen pantry	Pre-chill trolley in trolley bay			 Transfer items to be heated to oven	couple units for delivery to bed area	 remove tray, add hot items from oven	 reload trays for return to end kitchen; return to pantry
C. As **B.**, but regeneration static oven in ward kitchen. Items are loaded into oven for reheating and replaced on tray for service	Pre-chill trolley in trolley bay			 Place item to be reheated into oven; when hot, replace in trolley		 remove trays and serve	reload trays in trolley for return to end kitchen
D. 'Airline' tray-loaded into delivery trolley. Placed in holding and heating unit in ward pantry. Insulation keeps hot and cold food separate at serving temperature	Pre-chill trolley in trolley bay			 combined reheating and refrigerator unit – heats designated parts of tray only. Load trolley in cabinet when ready for reheat		remove trays and serve	reload into trolley for return to end kitchen

RETURN TO CENTRAL WASH UP

Figure 12 Tray service system – equipment requirements for 4 examples

Figure 13 Methods of distribution – 2. Bulk service

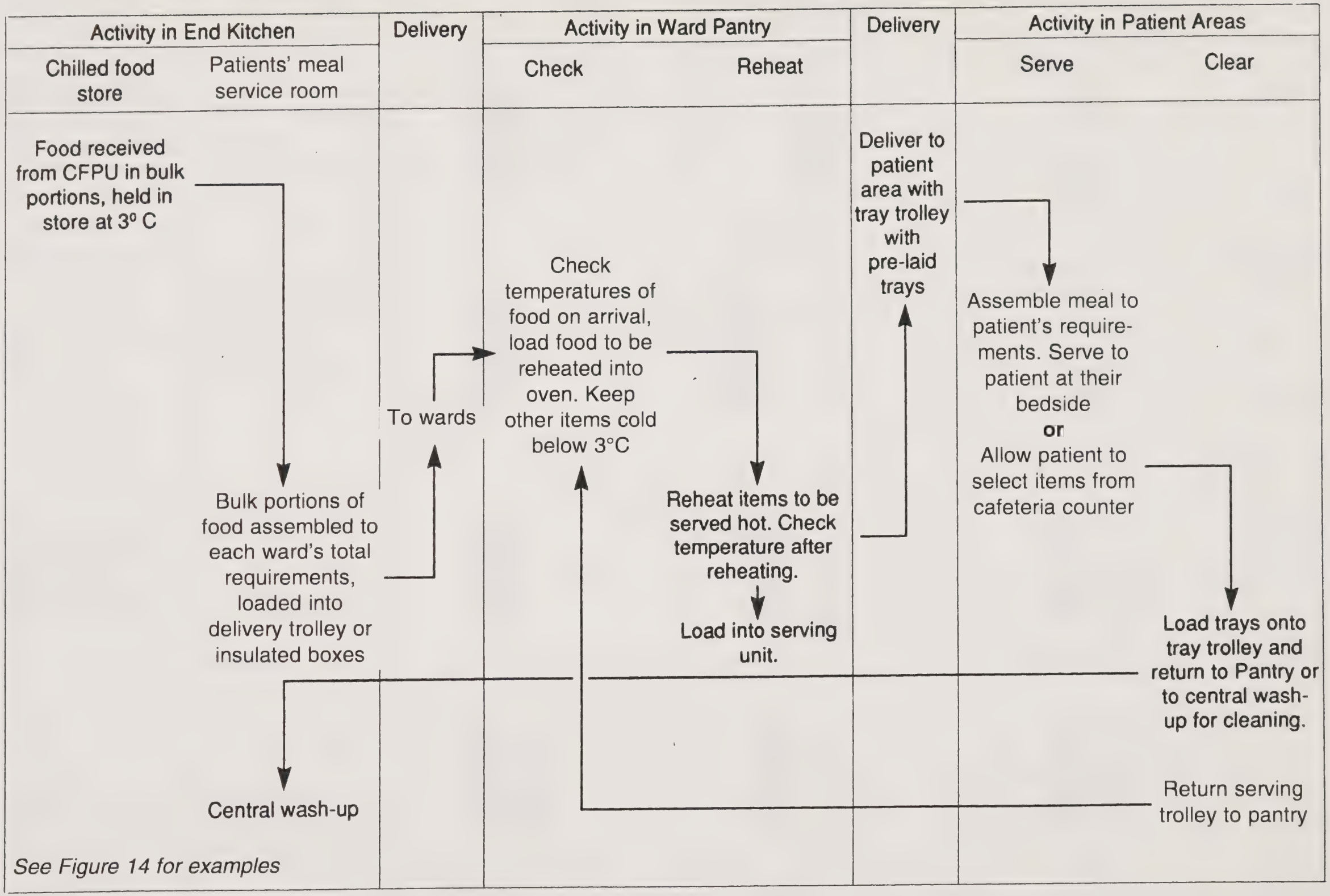

Activity in End Kitchen
Chilled food store
Patients' meal service room
Delivery
Activity in Ward Pantry
Check
Reheat
Delivery
Activity in Patient Areas
Serve
Clear
Food received from CFPU in bulk portions, held in store at 3° C
Bulk portions of food assembled to each ward's total requirements, loaded into delivery trolley or insulated boxes
To wards
Check temperatures of food on arrival, load food to be reheated into oven. Keep other items cold below 3°C
Reheat items to be served hot. Check temperature after reheating.
Load into serving unit.
Deliver to patient area with tray trolley with pre-laid trays
Assemble meal to patient's requirements. Serve to patient at their bedside
or
Allow patient to select items from cafeteria counter
Load trays onto tray trolley and return to Pantry or to central wash-up for cleaning.
Central wash-up
Return serving trolley to pantry
See Figure 14 for examples

Figure 14 Bulk service system – equipment requirements for 3 examples

Example	Activity in End Kitchen		Delivery	Activity in Ward Pantry	Delivery	Activity in Patient Area
	Chilled food store	Patients' meal service room				
VARIATION	Pre-chill trolley or boxes	Assemble bulk portions of food for wards. Load into trolley or insulated boxes		Check temperature, place items to be heated in oven	to bed-side or dining area	Serve from trolley
A. Uses fixed oven in pantry and mobile trolley with hot and cold section and tray trolley or rack	boxes: 3°C, 3°C or trolley: 3°C		→	hold: 3°C, 3°C; heat oven: 3°C, 70°C; tray trolley; Load hot & cold food into service trolley & serve to patients: 3°C, 70°C	→	3°C, 70°C; Clear trays onto rack; Return to pantry
B. As above but the serving counter is a static unit. Patients or serving staff collect meals	as above,	→	→	as above, boxes or trolley → 70°C; trays: 3°C, 70°C	←	patients or serving staff come to cafeteria type counter unit
C. As in **A.** and **B.** but the serving unit incorporates the oven and cold holding compartments	as above,	→	→	as above, boxes or trolley → 3°C, 70°C	→	serve: 3°C, 70°C; clear: trolley; Return to pantry; Return to central wash-up

d. loaded via a covered ramp into an enclosed purpose-built vehicle and taken to outlying units along public roads, or loaded into a vehicle with either a built-in tail lift, or into a vehicle body which is designed to be lowered to enable the trolleys to be wheeled inside.

Food service to patients in wards

8.10 This Note assumes that whichever of the service systems is used, the chilled food will be reheated as close to the point of service as is practical and will meet the criteria laid down in the DH Cook-chill and Freeze Guidelines.

Facilities required in wards

Ward pantry

8.11 The ward pantry, unless specifically designed for a chilled food service, will require modification. The traditional functions of the pantry include preparation of snacks, beverage making, storage of provisions and crockery, refrigerated storage of food, and minimal washing-up. In addition, space will be required for holding the chilled meal service equipment used, for manoeuvring the trolleys when checking the temperatures, and any other pre-wash-meal service activities. The amount of space required will depend on the design of trolley chosen. The trolleys may require additional power points or specialised supply. Project teams should ensure that in modifying the ward pantry, easy access by staff, patients and visitors is maintained.

8.12 The trolleys and reheating units may produce additional heat within the pantry and it may require increased ventilation. An electronic thermometer should be used to check the temperature of the chilled food in the delivery trolleys on arrival at each ward, and again after reheating prior to serving patients. The temperatures should be recorded. A small worktop for writing, and storage space for disinfectant wipes and disposable gloves should be provided.

8.13 This Note assumes that the tray service crockery and cutlery used for main meals will be returned to the central wash-up. The bulk service crockery and cutlery may either be washed in the ward pantry using a small commercial dishwasher or be returned by trolley to the central wash-up with the chilled food containers. A hand-wash basin and a double sink and drainer should be provided.

8.14 Staff responsible for the reheating and service of patients' chilled meals will require a room adjacent to the pantry for storing uniforms, for changing and for hand washing prior to serving the meals.

8.15 Alternatively, in existing high-rise hospitals where there is inadequate space in the ward pantry for storing and manoeuvring the trolleys, an area retrofitted for reheating/regeneration and serving several wards is coming to be known as a "hospital satellite kitchen".

Other types of food service

Cafeteria type food service

8.16 Where a chilled food service is introduced into a day hospital, in addition to the conventional serving equipment a refrigerator capable of holding the containers of food between 0°C and 3°C should be provided, fitted with an external recording thermometer. An oven or reheating unit for the chilled meals will be required, as well as space to manoeuvre the insulated chilled meal delivery trolley.

8.17 On arrival the chilled meals may be delivered in the trolley packed in multi-portion sized trays. These should be unloaded and placed in the chilled food refrigerator. The shelves should be capable of holding the weight and quantity of containers of food required. Prior to the meal service time, the trays of food should be loaded into the oven or reheating unit. After reheating they must be placed into the heated serving counter cut-outs ready for serving and held at a core food temperature at or above 63°C. For further guidance on food temperature good practice, please refer to EL(96)37 'Hospital catering: Delivering a quality service'.

Plated food service

8.18 Alternatively, in units where the day patients' choice of food is known in advance, the food could be pre-wash-plated in the end kitchen patients' food service area and delivered in a chilled food trolley, and held between 0°C and 3°C until it is reheated and served.

Family food service

8.19 As with the other systems described, the bulk containers of chilled meals are delivered to the unit and, on arrival, the containers of food to be served hot are put in the reheating unit. After reheating, the containers of food are placed in the cafeteria-type serving counter and the main course item put onto the pre-wash-heated plates and served to the patients. The accompanying vegetables and sauces in their dishes are put onto the table for patients to serve themselves.

9.0 Staff and visitors' food service systems

9.1 The chilled food for staff is delivered to the end kitchen from the CFPU in multi-portion containers or in disposable containers. The mobile insulated box with the containers of food will be wheeled from the bulk chilled food store and taken to the staff food reheating and cooking area.

9.2 The food should be held in a chilled food refrigerator capable of holding peak midday meal requirements, at a temperature between 1°C and 3°C.

Restaurant and coffee lounge

Entrance lobby

9.3 The lobby should open off the main hospital street, with easy access to toilet facilities.

Restaurant servery

9.4 For cafeteria service the total length and number of sections in the servery will depend on the peak number of diners to be served and the variety of dishes. The introduction of a chilled food service for staff may require minimal alterations to an existing servery. This Note assumes that the chilled food will be reheated in the adjacent staff food service room (see paragraph 7.20). A hatch and pass-through hot cupboard should be provided to ensure that the reheated food is transferred to the servery without delay. If disposable containers are used it is essential to ensure that the existing servery equipment is able to hold them for service.

9.5 The chilled food display counters and self service units used for holding this food must be capable of maintaining the food as required by the Food Safety (Temperature Control) Regulations 1995. Guidance set out in EL(96)37 'Hospital catering: Delivering a quality service' provides further advice on core food temperature controls. Food delivered from the CFPU may include salads, sandwiches, rolls and cold sweets. A separate room is provided in the end kitchen for preparing cold food.

9.6 Where a trolley is used instead of the pass-through hot cupboard to deliver the reheated staff food, space will be required for parking this trolley. A trolley may also be used to take the empty and unserved containers of food to the end kitchen central wash-up for washing and disposal. If a disposable food container system is used, a large mobile sack holder will be required to hold the empty containers until they can be taken to the compactor in the refuse bay.

9.7 After meal service all cook-chill foods taken out of chill store refrigeration and awaiting reheating, or used cold, for meal service must be considered as at-risk products. Core temperature checks will determine whether such products undergo immediate disposal as food waste (that is, core food temperatures are 10°C or above) or must be used within 12 hours (that is, where the core food temperature ranges from 3°C to 10°C). All cold food and reheated cook-chill foods unserved after meal service must be treated as food waste and disposed of accordingly.

9.8 The call-order equipment in the servery will be required for preparing and cooking snacks, grills and other call order items as in a conventional system.

Food store

9.9 This store should be sited adjacent to the main servery and requires ventilation, as bread, cereals and biscuits will be stored here. Storage units are also required for condiments, sauces, jams etc. The store should be lockable. The walls should be tiled and the worktop of stainless steel. Dairy items will be stored in a refrigerator which should be in the main servery and not within the food store.

Restaurant

9.10 An attractive environment and comfortable furniture should be provided to create an informal atmosphere. If waitress service is required, this can be accommodated within the overall layout. If the restaurant is licensed, appropriate storage will be required for wine and beer, and a separate glass washer and hand-wash basin should be provided.

9.11 Whenever possible the dining space should be sited to give some east to southeast light.

9.12 The size, shape and layout of tables selected will affect the capacity or size of the dining space. Generally the types of table used are rectangular, seating four, six or eight, or square, seating four. Although tables seating six or eight require less space overall than those seating four, it is preferable to use smaller tables as these provide more flexibility.

9.13 There are several methods of clearing restaurant tables. These include:

a. clearing by staff using a trolley;

b. 'self-clearing' – where diners take their dishes on trays and place them on the racks provided;

c. a mechanical method where diners place their trays on a moving conveyor belt or carousel which is linked to a central wash-up.

Coffee lounge servery

9.14 This may be incorporated in or separate from the restaurant.

Coffee lounge

9.15 The coffee lounge should be a pleasant area with seating arranged in groups around coffee tables. The apportionment of total area between the restaurant and the coffee lounge will depend on local policy and demand. Where the two spaces are contiguous they can be partitioned to permit adjustment from time to time. Trolleys used to clear away crockery etc will need suitable parking space.

Linen and disposable goods store

9.16 For storing linen and some disposables used in the restaurant and coffee lounge.

Cleaner's room

9.17 For the storage and cleaning of cleaning equipment used in the restaurant and coffee lounge.

Restaurant supervisor's office

9.18 An office is required for the restaurant supervisor and for staff interviews. This is essential complementary accommodation.

Furniture store

9.19 For storing tables and chairs. This is essential complementary accommodation.

Vending machine service

9.20 It is essential that the chilled food vending cabinet is capable of holding the food between 1°C and 3°C. The chilled vending machine (merchandiser) should incorporate a safety cutout which prevents the dispensing of food the temperature of which has been compromised. A microwave oven (commercial type) should be provided, with appropriate instructions to ensure adequate reheating.

Food courts

9.21 Provision of a food court is one solution to the requirement of rest and refreshment facilities. This consists of a number of kiosks, individually operated, offering a choice of food and refreshments, grouped around a communally serviced seating area.

9.22 A catering consultant or consultant environmental health officer should be appointed at the design stage to advise on the size and number of kiosks, methods of operation and detailed fitting and servicing.

9.23 The location of the food court is an important consideration. The following requirements should be noted:

a. functional relationships with other hospital departments must be sensitively handled;

b. the food court should be adjacent to the main pedestrian flow;

c. mechanical and electrical services (including gas, electricity, water, drainage, ventilation) should be ascertained at design stage as some will need to be integrated into the building structure;

d. service facilities (delivery to kiosk positions, storage, disposal of food waste and refuse) will be influenced by design decisions and whether tableware and crockery or disposables are to be used;

e. adequate staff facilities and toilets must be provided;

f. seating layouts and furniture choice influence space requirements;

g. accessibility and adequacy of customers' toilets must be ascertained.

9.24 The control and management of the food court will have a major influence on many design and planning decisions. Project teams should consider a range of management options, for example, hospital management with short leases to individual operations or letting the whole operation to major caterers.

10.0 A conventional kitchen on a hospital site

Introduction

10.1 The design and equipping requirements for a conventional hospital catering department are similar to those described in Chapters 2, 3, 4, 6 and 7, but the scale of operations and consequently the requirements will differ. When considering the content of the catering department, project teams should take into account:

a. local policies, for example supplies, storage and distribution;

b. catering operational policy;

c. the structure of the building and the available space.

Functional requirements

10.2 Considerations of economy and compliance with legal, statutory and other related requirements are important, particularly in terms of space provision, maintenance, staff, equipment utilisation and energy consumption.

10.3 Guidance provided in Chapter 2 'Service and general functional and design requirements for CFPUs' and Chapter 3 'Environmental health and finishes considerations in CFPUs and satellite end kitchens' is equally applicable to conventional hospital kitchens with comparable functional requirements.

10.4 A schedule of accommodation for a conventional kitchen is provided at the end of Chapter 13.

Location

10.5 The functional relationships between the catering department and other hospital departments need careful consideration. Ground floor level provides the most economic and convenient location, with easy access by delivery vehicles to the catering delivery bay. The catering department should not be located where it may be exposed to airborne and waterborne contamination. It should be located centrally to supply patients' needs within the shortest time and have direct connection to most hospital corridors. As the catering department is a high fire risk, there should be good access for fire-fighting appliances.

Workflow and functional relationships

10.6 A catering department with a conventional kitchen serves the entire hospital. Figure 15 shows the general workflow in the department including storage, kitchen, services, wash-up and restaurant. Planning solutions should not distort significantly this pattern with regard to workflow and food safety.

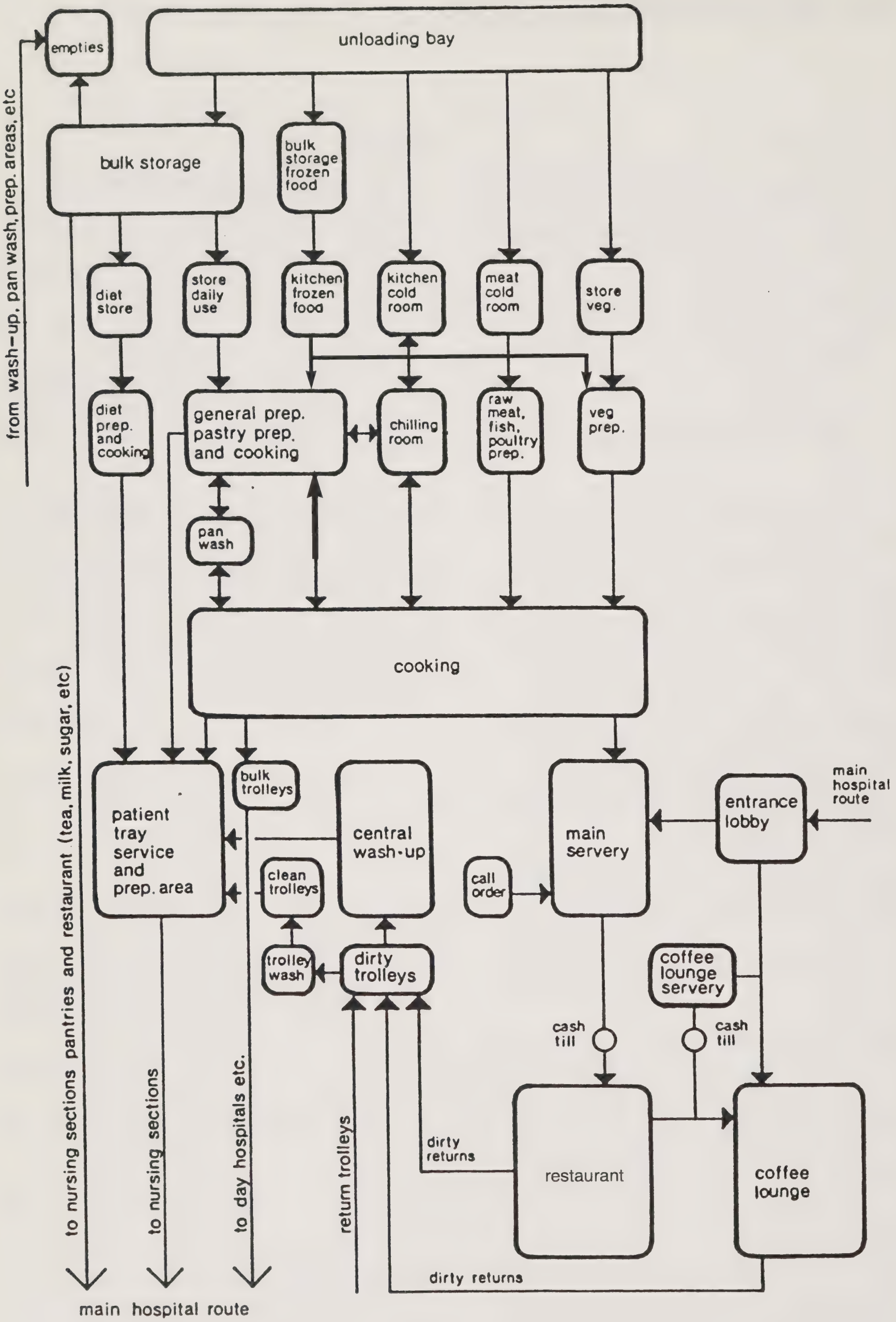


Figure 15 General workflow: kitchen and restaurant

11.0 Other general functional and design requirements

11.1 This chapter contains guidance on aspects of function and design which are common to health buildings generally and which will need to be borne in mind when designing new buildings or upgrading existing premises.

Fire safety

11.2 Firecode contains useful guidance on the Department's fire safety policies in NHS premises. In addition, Fire Practice Note 5 provides guidance on commercial enterprises on hospital premises. In Scotland and Northern Ireland, refer to 'Firecode in Scotland' and 'Firecode in Northern Ireland' respectively.

11.3 In the case of a CFPU, the Fire Precautions Act 1971 will apply to the premises, and a fire certificate from the local fire authority may be required.

Security

11.4 Assaults on hospital staff and theft of NHS property are recognised problems. The project team should discuss security with the officer in charge of the local police crime prevention department and the hospital security officer or adviser at an early stage in the design of the building. Fire and security officers should be consulted concurrently because the demands of security and fire safety may sometimes conflict. The attention of planners is drawn to 'Guidelines on Control and Security of Catering Assets in the NHS', issued with EL(96)13, and the revised edition of the NHS Security Manual issued with HSG(92)22. Caterers on the planning team should refer to guidance set out in the NHS Executive's booklet 'Risk assessment in the NHS', regarding the management of catering department security issues.

11.5 Security will normally be a matter of whole-hospital policy. Wherever supplies such as food, utensils, tableware, equipment, linen and cleaning materials etc are stored, precautions against theft will be required. For example, cupboards may need lockable doors, windows may have to be barred, and in certain circumstances there may be a requirement for audiovisual alarms or CCTV.

Smoking

11.6 NHSME circular HSG(92)41, entitled 'Towards smoke-free NHS premises', promulgates Government policy set out in the 'Health of the Nation' White Paper, and required NHS authorities and provider units to implement policies so that the NHS became virtually smoke-free by 31 May 1993. The circular advises that a limited number of separate smoking rooms should be provided, where necessary, for staff and patients who cannot stop smoking. Those areas should be clearly signposted.

Signposting

11.7 Signposting should form part of the whole hospital policy and be in accordance with the Health Signs Manual issued in November 1984 as HTM 65 – 'Signs' (new edition in preparation). HBN 40 – 'Common activity spaces' contains general guidance on this subject.

Component data

11.8 The Component Data Base consists of a series of Health Technical Memoranda (HTMs) which provide specifications and design guidance on building components for health buildings which are not adequately covered by current British Standards. No firms or products are listed.

Information technology

11.9 Information management and technology (IM&T) has a central role to play in stock control and management. The system selected should offer a wide range of facilities, and be consistent with local and NHS IM&T strategies details of which may be obtained from the Publishing Department, DH Distribution Centre, PO Box 410, Wetherby, LS23 7LN (tel: 01937 840250/2). A national overview of the trend towards networking and data communication networking systems is contained in 'A strategy for NHS-wide networking' which may be obtained from the NHS Executive. More detailed guidance on local area networks (LANs) is contained in the NHS IT Standards Handbook Volume 2, which may also be obtained from the NHS Executive.

Disabled people

11.10 It is essential to ensure that suitable access and facilities are provided for people who have problems of mobility or orientation, or other special needs. This

category includes, besides people who are wheelchair-bound, those who for any reason have difficulty in walking, and those with a sensory handicap such as visual or hearing impairment. Project teams are reminded of the need to comply with the provisions of:

a. the Chronically Sick and Disabled Persons Act 1970 and the Chronically Sick and Disabled Persons (Scotland) Act 1972;

b. the Chronically Sick and Disabled Persons (Amendment) Act 1976;

c. the Disabled Persons Act 1981;

d. the Disabled Persons (Services, Consultation and Representation) Act 1986;

e. Department of the Environment Approved Document M (1992) to the Building Regulations 1991;

f. the Disability Discrimination Act 1995.

11.11 Attention is drawn to BS5810: 1979 'Code of Practice for Access for the Disabled to Buildings' (under review). One of the effects of the 1981 Act is to apply this British Standard to premises covered by the 1970 Act, which includes those open to the public. Practical guidance for complying with the Building Regulations is issued by the Department of the Environment under Approved Document M: 'Access and facilities for disabled people'.

11.12 Project teams should refer to HBN 40 – 'Common activity spaces' – a set of four volumes which includes guidance and ergonomic data sheets on access, space and equipment relating to disabled users of health buildings.

11.13 It is recommended that project teams consult local representatives of disabled people, or the Centre for Accessible Environments and other similar organisations, with regard to the planning of spaces used by patients and escorts.

11.14 In locations where public telephones are provided, one should be mounted at a height suitable for use by a person in a wheelchair and the handset fitted with an inductive coupler to assist any person using a hearing aid. See also HBN 48 – 'Telephone services'.

Environment and design

11.15 Designers should create an environment that is both conducive to efficient working and which may contribute to staff morale. 'Environments for quality care: Health buildings in the community' may be helpful to project teams in considering these issues.

11.16 External landscaping is often of special value, although water features should be avoided, as they tend to attract flies and other insects. The design process should also include the choice of well-designed furniture and fittings and co-ordination of carpets and colour.

Art in health buildings

11.17 Works of art and craft can help to improve waiting area and rest room environments. However, care should be taken in the siting of works of art and craft in food handling areas. The advice of the environmental health officer should be sought.

11.18 Advice should be sought from experts on:

a. obtaining grants. In some cases, Regional Arts Boards or charitable trusts with a local interest may offer grants to add money within a capital scheme which is set aside for art or craft works. The Royal Society of Arts offers bursaries for collaborations between architects and artists;

b. obtaining sponsorship. Local industries may see an advantage in supporting an arts project as a way of reaching a wide, or particular, audience.

Courtyards

11.19 Courtyards enable more rooms to receive natural daylight and ventilation, and provide an outlook which can compensate for the lack of a longer view. Suitable layout and planting can help to preserve privacy in surrounding rooms. Ground-cover planting should be avoided, as it retains litter and provides cover and harbourage for rodents.

11.20 Access for maintenance should be from a corridor so that staff are not disturbed.

11.21 Reference should be made to HBN 45 – 'External works for health buildings' for more detailed guidance on this subject.

Telephones

11.22 Public telephones will be required for the use of staff, preferably in a convenient and accessible location. Reference should be made to paragraph 11.14 above with regard to the provision of public telephones for disabled people. Further guidance is contained in HBN 48 – 'Telephone services'.

Maintenance and cleaning

11.23 Materials and finishes should be selected to minimise maintenance and be compatible with their intended function. Building elements that require frequent redecoration or are difficult to service or clean should be avoided. Special design consideration should be given to corners, partitions, counters and other elements which may be subjected to heavy use. Wall coverings should be chosen with cleaning in mind. Wallpaper is not acceptable in food handling areas. Guidance on these aspects is given in HTM 56 – 'Partitions', HTM 58 – 'Internal doorsets', and HTM 61 – 'Flooring'.

11.24 In liaison with local authorities, consideration may need to be given to the provision of a dedicated bin store.

11.25 A planned maintenance programme for building and equipment should be instituted as part of the overall management system. This must include the annual change of ultraviolet light tubes in flykilling equipment.

12.0 Engineering services

Introduction

12.1 This chapter describes the engineering services contained within:

a. the central food production unit (CFPU);

b. the end kitchen, which also includes reference to the ward pantry.

For the purposes of this chapter, the term "catering department" includes both CFPUs and end kitchens.

12.2 The guidance should acquaint the engineering members of the multidisciplinary design team with the criteria and material specification needed to meet the functional requirements.

12.3 This Note assumes that the CFPU will be free-standing and independent of hospital engineering systems. It will therefore include its own boiler, refrigeration, air handling and its own hot and cold water storage cisterns and liquid nitrogen storage. Consideration should be given to the need for standby generation plant. If the unit is built within the grounds of other health buildings, the sharing of engineering services may be possible.

12.4 Primary services to the end kitchen will be provided by the hospital central system, with the exception of ventilation and refrigeration plant which are included in the cost allowance.

12.5 The engineering services for a catering department are complex and fundamental to the operation of the hospital, and they will have an important influence on the planning process if successful integration is to be achieved. The location of the catering department and its operational policies will determine the options for the design of the associated engineering services. These options require analysis at the preliminary design stage and will include vertical and horizontal distribution zones, plantroom locations, ventilation intake and exhaust air locations. In addition, the performance limitation and operating costs of the engineering installations will influence the general layout and nature of the building envelope as well as the more detailed constructional elements of the fabric.

12.6 Some of the more important matters which should be examined at the early design stage are:

a. the possibility of the catering department functional content increasing at some later date, thereby influencing the initial size of distribution and plant zones. An element of adaptability should be available within any design, particularly in equipment zones, where improved models are continuously being developed. Such adaptability is particularly necessary in hospitals which are subject to extensive planning stages;

b. the catering department requires conditions of cleanliness and safety with means for maintenance and routine inspection that minimise disruption and risk of contamination. Engineering services and catering equipment will normally have a much shorter life than the building fabric, and access for plant removal and replacement should therefore form part of the design concept. Catering departments are very prone to infestation, and service ducts, trunking, channels, casings, pipework and insulation should be designed and installed to prevent the ingress of rodents and insects. All thermal insulation should incorporate an impermeable washable finish;

c. high levels of radiant heat emission together with high humidity are common in most catering departments and create uncongenial working conditions. Project engineers should recognise the increasing influence of health and welfare requirements on design standards. Whilst improved equipment design may reduce space heat gains, the need for mechanical ventilation will remain;

d. as catering departments are major consumers of process heat, measures should be implemented to improve energy conservation. Whilst the primary aim is to minimise energy usage by energy-conscious operational policies and by design, for example improved insulation and controls to reduce excess heat emission from equipment, a secondary aim should be to achieve heat recovery where viable. The obvious sources of recovery are heat from extract air, and condenser heat from refrigeration rooms. Each aspect of energy recovery should be evaluated and implemented where economically viable. In many cases sufficient adaptability can be built into system design and plantroom accommodation to allow phased implementation at a later date. Engineering services should however be designed to obtain the optimum benefits from the capital invested.

Model specifications

12.7 NHS Estates Model Engineering Specifications, including the Scotland and Northern Ireland supplements, are sufficiently flexible to reflect local needs. The cost allowance is based on the quality of material and workmanship described in the relevant parts of the specifications.

Economy

12.8 Engineering services are a significant proportion of the capital cost and remain a continuing charge on revenue budgets. The project design engineer should therefore ensure:

a. economy in initial provision, consistent with meeting functional requirements and maintaining clinical standards;

b. optimum benefit from the total financial resources which these services are likely to absorb during their lifetime.

12.9 Where various design solutions are available, the consequential capital and running costs should be compared using the discounting techniques described in the Capital Investment Manual.

12.10 The economic appraisal of various locations and design solutions should include the heat conversion and distribution losses to the point of use. Where buildings are located remote from the development's load centre, these losses can be significant.

12.11 The energy management and accounting system should be part of the hospital building management system (BMS), and meters should be installed within the CFPU and end kitchen to record the consumption of gas, oil, electricity, steam (if used), and hot and cold water. If a hospital system is not available, a stand-alone system should be designed. It should also be suitable for subsequent integration with a future BMS.

12.12 In view of the increasing cost of energy, the project team should consider the economic viability of heat recovery. Designers should ensure that those services which use energy do so efficiently and are metered where practicable.

Maximum demands

12.13 The estimated maximum demand and storage requirement, where appropriate, for each engineering service will need to be assessed individually to take account of the size, shape, geographical location, operational policies and intensity of use of the department. NHS Estates may provide estimates of the maximum demand and storage requirements for a specific project if required by the project team.

Activity data

12.14 Environmental and engineering technical data and equipment details are described in the Activity Data Sheets (refer to Chapter 13). They should be referred to for space temperatures, lighting levels, outlets for power, telephones, equipment details etc.

Safety

12.15 The Health and Safety at Work etc Act 1974, as partly amended by the Consumer Protection Act 1987, together with the Workplace Regulations and the Work Equipment Regulations, imposes statutory duties on employers and designers to minimise – so far as reasonably practicable – any risks arising from the use, cleaning or maintenance of engineering systems.

12.16 One of the requirements of this legislation is to ensure, so far as is reasonably practicable, that design and construction is such that articles and equipment will be safe and without risks to health at all times when they are being set, used, cleaned or maintained by a person at work.

Noise

12.17 Excessive noise and vibration from engineering services, whether generated internally or externally and transmitted to individual areas, or noise from other sources, for example speech which can be transmitted by the ventilation system, can adversely affect the operational efficiency of the department and cause discomfort to patients and staff. The limits and means of control advocated in HTM 2045 – 'Acoustics' should provide an acceptable acoustic environment.

Fuel selection

12.18 The choice of fuel for food processing will depend on the following considerations:

a. cost;

b. availability;

c. suitability;

d. security of supply and the need to avoid dependence on one source.

12.19 Normally, most of the equipment will be heated by gas, but equipment may need to provide for some flexibility between fuels and to give an emergency service in the event of any one fuel supply failing. Some gas equipment requires an electrical supply for operation of controls, and this should be provided from the essential supply.

12.20 Electricity is required for much of the preparation equipment and can be used in certain heating processes. When selecting electrically-powered heating equipment, consideration should be given to the hospital load curve. There may be cost penalties if the electrical cooking load significantly increases the total maximum demand.

12.21 The use of steam as a heat source for catering has only a limited application but does offer advantages as an alternative source of energy if gas or electricity supplies are disrupted. Where a steam supply is available, it should be used for "wet" cooking processes, but the use of steam in the kitchen should not dictate its choice as a primary heating medium for the whole hospital. Where medium pressure hot water is used for primary heating it may be possible, depending on temperature and pressure, to generate steam local to the kitchen.

Space for plant and services

12.22 Space for plant and services should provide:

a. easy and safe means of access, protected as far as possible from unauthorised entry;

b. for frequent inspection and maintenance. Sufficient access panels should be provided for this purpose;

c. for eventual removal and replacement of plant.

12.23 Recommended spatial requirements for mechanical, electrical and public health engineering services are contained in HTM 2023 – 'Accommodation for plant and services'. The information in this HTM is specifically intended for use during the initial planning stages when precise dimensional details of plant are not available.

12.24 Heat emitters in non-food handling areas should be contained within a 200 mm wide perimeter zone under window sills, and critical dimensions should be taken from the boundary of this zone. The 200 mm zone includes the floor area occupied by minor vertical engineering ducts and is included in the building circulation allowance.

Access to control and isolation devices

12.25 Devices for control and safe isolation of engineering services should be:

a. located in circulation rather than working areas;

b. protected against unauthorised operation;

c. clearly visible and accessible, where intended for operation by the department's staff.

12.26 Primary services should be distributed in horizontal zones within the ceiling void above the catering department, and should be sleeved and sealed where they pass through the structure, using a sealant which can accommodate movement.

12.27 The distribution system to service spines should be contained within vertical sealed ducts. The ducts should also contain isolating valves and sealed access covers. The services within island or peninsular spines should be contained in purpose-made stainless steel enclosures and mounted sufficiently clear of the floor to permit adequate space for cleaning. The enclosure should be robust and sealed to prevent vermin entering. It should also be arranged for convenient sectional dismantling.

12.28 Where, for convenience, horizontal services are mounted on a wall and an enclosure is considered unnecessary, pipework, valves, fittings and supports should be in stainless steel or non-ferrous materials and should be located neatly for ease of cleaning. They should not be insulated.

12.29 Equipment should be movable for cleaning and should be connected by quick-release bayonet or socket/plug fittings and flexible tubing. The fittings and valves should be fixed to the spine. Equipment should discharge over fixed tundish drains.

Engineering commissioning

12.30 The engineering services should be commissioned in accordance with the validation and verification methods identified in the latest HTMs. Engineering services for which a specific HTM is not currently available should be commissioned in accordance with 'Engineering commissioning' published by the Institute of Healthcare Engineering and Estate Management. Flow measurement and proportional balancing of air and water systems require adequate test facilities to be incorporated at the design stage. Guidance is also contained in a series of commissioning codes published by the Chartered Institute of Building Services Engineers.

MECHANICAL SERVICES

General

12.31 The requirements for the control of legionellae bacteria in hot and cold water systems are set out in HTM 2040 – 'The control of legionellae in health care premises: a code of practice'.

Hot, cold and drinking water services

Non-food handling areas

12.32 The design and installation of hot and cold water supply and distribution systems should comply with the local water regulations and HTM 2027 – 'Hot and cold water supply, storage and mains services'.

12.33 The domestic hot water supply should be taken from the calorifier installation at a minimum outflow temperature of 60°C ± 2.5°C and distributed to all outlets such that the return temperature at the calorifier is not less than 50°C.

Food handling areas

12.34 Potable cold water is required in all food and beverage preparation areas and for direct connections to boiling pans, steamers, servery outlets and drinking water dispensers. The provision of hot water at 60°C ± 2.5°C is required throughout the department, with a major requirement for dish and pan-washing, the latter requiring locally boosted temperatures for sanitising purposes. Amenity areas also require hot and cold water for sanitary facilities and sinks.

12.35 Water supplies to appliances should be compatible with the pressure/volume requirements specified by the manufacturer, and dishwashers may require an integral booster pump and treated water to ensure satisfactory operation. All equipment should have adequate isolation valves, and where these are located in kitchen areas they should be fitted with an easily cleaned cover. Where a hose fitting may be connected to an outlet or wherever back siphonage may occur, anti-siphonage devices of an approved type should be incorporated.

12.36 All cold water pipework, valves and fittings should be economically insulated and vapour sealed to protect against frost, surface condensation and heat gain, in accordance with paragraph 11.28.

12.37 Hand-wash basins in the hygiene control bay and food preparation rooms should be fitted with "hands-free" taps.

Heating

Non-food handling areas

12.38 Spaces heated by low pressure hot water systems should use radiators of the low surface temperature type. Surface temperatures should not exceed 43°C. Exposed hot water pipework, accessible to touch, should be insulated. Further guidance is contained in Health Guidance Note – '"Safe" hot water and surface temperatures'.

12.39 Radiators should normally be located under windows or against exposed walls with sufficient clear space between the top of the radiator and the window sill to prevent curtains reducing the output. There should be adequate space underneath to allow cleaning machinery to be used. Where a radiator is located on an external wall, back insulation should be provided to reduce the rate of heat transmission through the building fabric.

12.40 It is recommended that radiators are fitted with thermostatic radiator valves. These should be of robust construction and selected to match the temperature and pressure characteristics of the heating system. The thermostatic head, incorporating a tamper-proof facility for presetting the maximum room temperature, should be controlled via a sensor located integrally or remotely as appropriate. To provide frost protection at its minimum setting, the valve should not remain closed below a fixed temperature.

12.41 Radiators may also be used to offset building fabric heat loss in mechanically ventilated spaces.

12.42 Flow temperatures to heating appliances should be controlled by the BMS in accordance with space requirements and external temperatures. The system should be zoned to suit the building.

Food handling areas

12.43 The cooking area will usually not require heating during working hours, but some heating may be required to maintain a minimum temperature overnight and for preheating prior to occupation. Overnight heating can be provided by the mechanical ventilation system operating at minimum volume. During working hours, the system should not supply air at a temperature of less than 16°C.

12.44 Heating systems should be time controlled to provide "optional start" in the morning and a "set back" space temperature outside working hours.

12.45 Facilities should be provided to reprogram the control system on those occasions when it becomes

necessary to extend operation of the unit beyond normal working hours.

Ventilation – general

12.46 Detailed guidance on ventilation is contained in HTM 2025 – 'Ventilation in healthcare premises', Design considerations volume.

12.47 External discharge arrangements for extract systems should be protected against back pressure from adverse wind effects and should be located to avoid reintroduction of exhausted air into this or adjacent buildings through air intakes and windows. Bird-proofing of extractor fans should be considered.

12.48 Where practicable, all volume control devices should be located outside food processing areas. Access to any fire dampers should also be located outside the food processing area.

12.49 Utensil washing machines should be independent, locally controlled constant volume extract systems.

Ventilation of cooking area

12.50 The cooking area mechanical ventilation system should:

a. remove fat, grease, vapours, products of combustion and heat at source;

b. collect fat and grease and avoid their carryover to the extract system;

c. aim to prevent carryover of fire into the extract system;

d. provide tempered fresh air for staff;

e. provide a comfortable environment for staff by promoting air movement adjacent to heat-producing equipment;

f. be hygienic and easy to maintain and clean;

g. discourage cooking odours permeating beyond the cooking area;

h. control condensation;

j. be economical and, where practicable, energy-efficient.

12.51 These objectives can usually only be achieved in the cooking, wash-up and server areas by the provision of mechanical ventilation comprising supply and extract systems with interlocking controls. Extract air volumes should be based on the type, size and location of catering equipment used and should take into consideration thermal efficiency of equipment, normal operating loads and pattern of usage, all of which influence the amount of heat and vapour emission. Estimating the ventilation requirements by considering only the kitchen volume and area, or by specifying an empirical figure for the hourly air-change rate, is not acceptable.

12.52 Detailed heat load calculations will need to be undertaken to take account of:

a. potential heat gains for types and sizes of equipment operating under normal conditions. A more accurate calculation can be achieved by taking the instantaneous rate of energy input required to maintain the appliance temperatures necessary for typical cooking tasks;

b. input ratings for fast warm-up times and maximum temperature settings, normally greater than the instantaneous rate of energy input;

c. the use of an appliance without a separate exhaust flue to atmosphere (appears as heat gain to the cooking area);

d. only the radiative heat loss from the hot surfaces contributes to the room heat gain when effective extract canopies are used – between 10% and 30% of the energy input;

e. miscellaneous heat gains, for example conveyor belt motors, occupants etc;

f. latent heat load from uncovered boiling pans (but these contributions are likely to be negligible in comparison with the radiant heat load from the cooking appliances);

g. heat loss through the fabric of the building in winter and through infiltration of air through doors and windows;

h. solar gain in summer.

12.53 The calculated kitchen heat gain, which will vary for summer and winter conditions and for periods of peak and night-time use, is the basis for estimating the exact airflow rate required for the kitchen.

12.54 The airflow rate obtained by the above procedure must be sufficient to ensure adequate capture velocity in the vicinity of the exhaust extract intake. Grease filters should be installed as an integral part of the exhaust extract intake over cooking equipment, to prevent flammable grease reaching the fire damper, exhaust duct, fan or structure. Disposable filters are suitable for exhaust air containing high levels of grease. If used in high grease applications, washable filters acquire an irremovable layer of "baked-on" grease and cease to be efficient. The grease content of air in the CFPU, however, is likely to be much less than in a conventional kitchen, and filters of the washable type should give satisfactory service.

12.55 Proprietary ceiling systems which dispense with the need for conventional extract canopies are available, but experience of their performance is limited and carryover of grease etc can occur. They should therefore be considered only after a thorough evaluation of their performance.

12.56 It is not practicable to rely on natural ventilation to provide the quantity and quality of make-up air required for large kitchens, and a mechanical supply air system should be installed. It should provide between 80 and 90 per cent of the extract volume to ensure that air movement is towards the cooking area. Careful consideration should be given to make-up air paths to avoid user discomfort or, in the case of the server areas, the cooling effect on the food. The supply air system temperature should be scheduled either by a space-mounted detector or by remote set-point adjustment located in a suitable position within the department. Override control should be included to ensure a minimum supply air temperature of 16°C at any time. Mechanical cooling is not normally provided.

12.57 Due to the fire risk arising from the high level of contamination likely to be encountered in the air extracted from the frying battery, this should be ducted to atmosphere independently of any other extract system, with the fan motor controlled by a local emergency isolator. Even with grease interceptors the level of contamination would normally preclude the use of variable volume devices in the extract ductwork.

12.58 Fans should be selected for peak efficiency at the point of normal, rather than peak, operation and should be related to the fan speed.

Ventilation control – CFPU

12.59 To encourage energy conservation, ventilation systems should be programmed to suit the functional requirements, and be time-switch controlled. Provision should also be made for varying the volume to the main supply and extract system in accordance with the number and types of cooking and other ancillary equipment in simultaneous use.

12.60 Project teams should note that the cooking pattern in the CFPU may be relatively constant. The designer should therefore seek to determine at an early stage the likely cooking pattern and the most economically viable system.

Ventilation control – end kitchens

12.61 Supply and extract ventilation systems should include controls and indicator lamps in the plantroom to confirm the operational status of each system. Alarms should be repeated in the catering manager's office and maintenance department. Controls will usually include those for temperature/time switching functions. Their selection should take account of the extent to which they can be linked to, or provided by, a building management system serving the whole hospital.

12.62 A time-restricted, manual override switch should be provided to operate the heating system.

Ventilation control – ward pantry

12.63 After reheating food and whilst the reheat trolley doors are open, the temperature within the pantry can rise to uncomfortable levels. However, heat emissions can be controlled by keeping the trolley doors closed after reheating.

12.64 An assessment should be made by the project team to establish the need for mechanical ventilation and cooling.

Ventilation (substances hazardous to health)

12.65 Local exhaust ventilation will be required where exposure by inhalation of substances hazardous to health cannot be controlled by other means. The Health and Safety Executive in their current publication EH40, Occupational Exposure Limits, updated annually, set limits which form part of the Control of Substances Hazardous to Health Regulations 1994 (COSHH).

Gas services

12.66 A gas supply terminating in a well-ventilated meter room, accessible from outside, will be required. The incoming supply should have an isolating valve and a separate meter to monitor gas consumption to the unit. Gas will normally serve cooking equipment, boiler plant and may also serve hot water heaters.

12.67 Branches serving each item or group of items of equipment should be fitted with a gas flow sensor which provides a signal to the ventilation controls.

12.68 Gas connections to individual items of cooking equipment should be made with quick-release bayonet or socket/plug fixings and flexible, yellow ochre-coloured pipes. A restraining chain should be fitted to the equipment.

12.69 The main gas supply should also be controlled by an emergency shut-off valve operated by the fire alarm system.

12.70 Where liquefied petroleum gas is used, additional safety precautions are required and HSE Guidance Note CS5 should be consulted.

12.71 Gas installations should comply with BS6400 and BS6891 and the requirements of the Gas Safety Regulations 1972.

Kitchen equipment

12.72 Energy-efficient equipment should be selected where possible. Such equipment also enables economies to be made in ventilation systems and can provide a basis for an energy-conscious design.

12.73 The selection criteria should include:

- controls for general purpose ovens, hobs and grills should encourage switching off when not in use;
- enhanced casing insulation for ovens, boiling pans, bain-marie and dishwashers, to reduce surface heat emissions and improve operational safety;
- timers on grillers, general-purpose ovens and vegetable preparation machines, to reduce over-running when the appliance is not in use;
- dishwashing machines which utilise:
  - (i) integral rinse water heaters;
  - (ii) rinse water economisers to reduce domestic hot water usage, by shutting off rinse water when not required;
  - (iii) exhaust ventilation condensers for recovery of exhaust heat to preheat cold feed water with or without heat pump operation, when economically viable;
- judicious selection of boiling pans (quantity and capacity) to encourage high utilisation;
- greater emphasis on the use of energy-efficient bratt pans and high-speed steamers and combi-cookers;
- fuel selection based on the cost per useful kW;
- equipment which discharges smaller amounts of grease to the ventilation system.

Temperature-controlled storage

12.74 All cold and frozen food stores can be constructed to a similar standard within a basic brick or blockwork shell provided by the builder.

12.75 Stores should be well insulated, of robust construction and vermin-proof. Walls, ceilings and floors should be vapour-proof. Surface finishes should be suitable for periodic wash-down. The floor should drain easily and should have an external ramp, where appropriate, to provide easy access for trolleys. The space should be free from structural columns. Walk-in freezers should be located away from sources of water, to prevent ice forming on the floor.

12.76 The economical thickness of insulation will depend on storage temperature and fuel cost. However, the thermal efficiency should ensure that the cooling plant total running time does not exceed 16 hours per day under normal room usage with an external ambient of 20°C. All doors should be fitted with internal safety release mechanisms and air-tight gaskets to ensure air-sealing when closed. For low-temperature applications, doors should be fitted with anti-condensation heaters. In addition, provision should be made for preventing partial vacuum occurring after the defrosting operation, that is, by the incorporation of an automatic pressure equalising device.

12.77 Particular care is necessary in monitoring temperature fluctuations in the storage of pre-wash-cooked chilled food. A remote temperature reading device should be located outside cold rooms.

12.78 Condenser units will generally be of the unitary semi-hermetic type, with one condenser unit for each cold room except in the case of chilled holding rooms, where duplicate units are preferred. However, an assessment should be made by the project team to establish whether there are economic benefits to the project in utilising centralised refrigeration plant with potential for heat recovery. To achieve optimum performance, a suitable plant zone that affords good access and adequate air-cooling should be available for the siting of condenser units.

12.79 Cooling units, either single or multi-fan discharge, should be located in ceiling or side wall positions such that good air distribution is achieved. Where it is advisable to prevent air movement when the door is open, an automatic door interlock switch should stop the circulation fan. For units operating in a room temperature of minus 2°C or below, automatic defrost heaters should be incorporated, operated by time-clock control. Condensation lines routed to an external drain point should be traced with heater tape.

12.80 Where air curtains are provided to discharge at a temperature less than that within the store, they should be controlled to operate automatically when the door is open. They should also be mounted on the high-temperature side of the door.

12.81 An alarm, for operation by staff who may be trapped inside, should be connected to the main system.

12.82 Each store should have an electronic temperature recorder and a high limit thermostat which operates an external indicating light and remote audible and visual indicator. Visual/audible indication of normal/abnormal conditions and defrost operations should be monitored on a central panel located in a continuously manned area.

12.83 The increasing demand for refrigerated storage operating with a high load factor may offer some potential for heat reclamation. Some methods of energy conservation and recovery worth exploring are:

- the use of heat interchangers located on refrigerant lines to improve refrigeration system performance by sub-cooling liquid refrigerant and super-heating of suction gas;
- recovery of reject heat from the refrigeration cycle for pre-wash-heating supply ventilation.

Blast chillers

12.84 Generally, blast chillers must be capable of reducing the food temperature to between 0°C and 3°C within 90 minutes when fully loaded. Guidance on cooking, chilling, storage and other aspects of cook-chill is contained in 'Chilled and Frozen – Guidance on Cook-Chill and Cook-Freeze Catering Systems' (Department of Health).

12.85 Two types of rapid chiller are commonly used:

a. cryogenic (liquid nitrogen or some other non-oxidising gas) equipment, which circulates gas at a low temperature;

b. electro-mechanical, which recirculates air at low temperature.

12.86 Whichever type of chiller is used, the process should be controlled automatically and the core temperature of the food should be recorded.

12.87 Food production units will usually have a combination of electromechanical and cryogenic chillers of the "pass-through" type. The number and size of each type will depend on the menu.

Cryogenic chillers

12.88 Liquid nitrogen (minus 196°C) is released into the food chamber of the chiller and flashes immediately to gas.

12.89 Accommodation for cryogenic chillers must be well ventilated to remove excess nitrogen. The air change rate will depend on the number, size and throughput of chillers.

12.90 Temperature recording facilities with appropriate end of cycle warning and recording features should be relayed into the manager's office.

12.91 Additional floor insulation is required below the chiller.

12.92 Drainage outlets should be provided at chiller doors.

Liquid nitrogen storage

12.93 A large liquid nitrogen storage vessel, external to the building but as near as practical to the chillers, is required. The size will depend on the chilling load, intervals between refills, and geographic location.

12.94 For preliminary planning it can be assumed that:

a. the chilling process usually requires about 1.3 kg (nitrogen)/kg food;

b. two weeks' storage should suffice;

c. a weekly refill of nitrogen is common.

12.95 The storage compound requires safety lighting, protection fence and hard standing for tankers for refilling. The storage vessel is normally rented from the supplier.

Liquid nitrogen distribution

12.96 Liquid nitrogen is piped to the blast chillers by means of a super-insulated vacuum line (SIVL). SIVLs are constructed from small bore stainless steel tube surrounded by a radiation barrier foil material, a vacuum space and an outer tube of stainless steel. An SIVL should be protected against mechanical damage.

Electromechanical blast chillers

12.97 Blast chillers consist of an insulated compartment which accommodates trolleys. Cooled air (approximately minus 8°C) flows down one side of the chamber containing the trolleys, on which racks of cooked food are stacked. The air then flows across the racks and returns to the fan cooling coil.

Refrigeration plant

12.98 Mechanical refrigeration plant is required for:

- blast chillers;
- preparation areas;

- cold stores;
- frozen food stores.

12.99 The system can be arranged along conventional lines with separate "duty" and "standby" compressors serving individual spaces.

12.100 Alternatively a "cascade system" (with provision of a standby compressor) using common suction and flow headers can be used. A low-noise, external, air-cooled condenser can be arranged with a number of coils and fans to provide an element of standby.

12.101 Generally, spaces fall into one of two temperature bands as follows:

a. greater than minus 1°C;

b. less than minus 18°C.

12.102 Therefore, two cascade systems could be employed. A high temperature system for spaces above minus 1°C and a low temperature system for spaces below minus 18°C. The blast chillers could be supplied from the high temperature system.

12.103 The designer should ensure that:

a. plant is adequately sized to maintain the required duty/chilling capacity whatever the external ambient temperatures;

b. space temperatures are maintained via fan coiled coolers/low velocity air ventilation systems as appropriate;

c. an appropriate barrier inhibits airflow between rooms having different temperature requirements;

d. trolleys containing hot food in the cold portioning area should, where possible, be parked beneath an extract canopy to remove a large part of the heat source. The simultaneous heat gain should be carefully assessed to ensure that room coolers are of adequate capacity.

Refrigeration distribution system

12.104 The refrigerant distribution pipework should be located externally to simplify repair to or modification of the system, should the need arise.

12.105 The distance between plant and terminal coolers should be kept to a minimum and within manufacturers' limits.

Refrigerant leak detection system

12.106 The project team should determine whether a refrigerant leak detection system with monitoring and alarm facilities relayed to the main alarm panels should form part of the insulation.

Terminal units

12.107 The temperature within cold preparation areas will usually be controlled by low-velocity air ceiling-mounted coolers. The direction and velocity of the air should be arranged to minimise staff discomfort.

12.108 The temperature within cold and frozen stores should be controlled by wall- or ceiling-mounted coolers, designed to provide uniform coverage through the space.

12.109 All terminal units should have defrost gravity drains. Pumped drains should be avoided where possible. Drains should be trapped and have an air break prior to connection below ground. They may also be arranged to provide visual indication of operation.

Condenser heat recovery

12.110 The economic viability of a ventilation heat recovery system will depend on a number of variables, and the designer should evaluate these at an early stage.

ELECTRICAL SERVICES

Electrical installation

12.111 The installation should comply in all respects with BS7671 – 'Requirements for Electrical Installations', IEE Wiring Regulations 16th Edition (and subsequent amendments) and HTM 2007 – 'Electrical services: supply and distribution'.

12.112 The point of entry for the electrical supply should be a switchcupboard housing the main isolators and distribution equipment. This space will also be the distribution centre for subsidiary electrical services. Supplies should be metered and, wherever possible, equipment should be mounted at a height which gives easy access from a standing position. It should be possible to secure switchgear in the "off" position.

12.113 The electrical equipment in occupied areas should generally be concealed using PVC insulated cable and screwed steel conduit or trunking but, in certain circumstances (for example very steamy conditions), mineral-insulated metal-sheathed cables may be

necessary. External installations should use PVC insulated cables in galvanised screwed steel conduit with waterproof fittings.

12.114 Exposed cables in food preparation areas should be installed so as to minimise the accumulation of dirt and to facilitate cleaning, for example using stand-off plastic clips or non-ferrous brackets. Access to all gaps between cables and trunking or conduit must be sealed against pests.

Socket-outlets and power connections

12.115 Sufficient 13 amp, shuttered socket-outlets, connected to ring, spur or radial circuits, should be provided to allow all portable appliances, used simultaneously, to be supplied individually. The installation of twin outlets should be considered where these activities occur in juxtaposition.

12.116 Switched socket-outlets should be provided in corridors and in individual rooms to enable domestic cleaning appliances with flexible leads (9 metres long) to operate over the whole department.

12.117 Appliances requiring a three-phase supply, or those rated in excess of 13 amp single-phase, should be permanently connected to separate fused sub-circuits. The sub-circuits should be fed from the distribution board and terminate at a local isolator. Fixed appliances of less than 13 amp rating, should be permanently connected to a double-pole switched 13 amp spur outlet. The spur outlet should contain an indicating light, where appropriate, and a suitable fuse.

12.118 Heating appliances and automatic equipment should have indicator lights to show when they are energised. Such indicators should be contained in the control panel of the apparatus, in the control switch, or in the socket-outlet from which the apparatus derives its supply.

12.119 All socket-outlets in food handling areas should be splash-proof.

12.120 The socket-outlets in food handling areas should be supplied via at least two separately controlled circuits of the same phase.

12.121 Every permanently connected item of equipment should have an isolating switch, separate from and additional to any switch fitted to the equipment. In food processing areas every group of socket-outlets should have an isolating switch, separate from and additional to any integral socket-outlet switch. This isolating switch is for:

a. emergency isolation of equipment in the event of fire, serious spillage, leak etc;

b. isolation of equipment on completion of a cooking or preparation session to prevent fire and permit safe cleaning.

12.122 The final connection to each item of equipment should permit withdrawal or removal of each item for cleaning or repair. Where appropriate, the wiring system should be protected against the effects of heat.

Emergency electrical supplies

12.123 Guidance on emergency electrical supplies is contained in HTM 2011 – 'Emergency electrical services'.

12.124 Food refrigeration plant, emergency lighting and sufficient socket-outlets to supply a selection of food preparation equipment, for example mixers, blenders, peelers etc, should be supplied from essential circuits. To allow the processing of food in gas- or steam-heated equipment to continue during electric power disruptions, all electrically operated controls, for example timers, over-fans, flame failure protection devices etc, should also be supplied from essential circuits.

12.125 Particularly when there is no electrical cooking load, a very high proportion of the total load will be supplied from essential circuits. Consideration should be given to simplifying the distribution system by sizing the standby power system for 100% of the load.

Ward pantry electrical load

12.126 A three-phase electrical supply should be provided for the reheat trolleys. A single-phase regeneration trolley may require a 60 amp 15 kW supply, with no diversity, over the reheat period of approximately 30 minutes.

12.127 Within existing accommodation, the total simultaneous demand should be compared with existing spare capacity. It may be necessary for management to phase or stagger regeneration times between wards to reduce the electrical load.

Lighting

12.128 The number and location of luminaires connected to a circuit and the number of switches and circuits provided should allow flexibility in the general and local level of illumination, particularly in areas away from windows where daylight can vary significantly. Some areas of the department which may be unoccupied for long periods may also be suited to automatic/presence switching.

12.129 Generally, energy-efficient luminaires should be used wherever possible. Intermittently and infrequently used luminaires may be fitted with compact fluorescent or incandescent lamps.

12.130 Fluorescent luminaires should comply with BS 5394.

12.131 Where visual display terminals (VDTs) are to be used, the lighting should be designed to avoid bright reflections on the screen and to aid the legibility of the screen. Further guidance is contained in the CIBSE Lighting Guide LG3.

12.132 The lighting of corridors, stairways and other circulation areas, which generally are areas not covered by Activity Data A-Sheets, should be in accordance with the guidance contained in HBN 40/SHPN 40 – 'Common activity spaces', Volume 4.

12.133 Safety lighting should be provided on primary escape routes in accordance with HTM 2011 – 'Emergency electrical services' and BS 5266.

Lighting in restaurants and coffee lounges

12.134 The lighting design for restaurants and coffee lounges should provide a welcoming and relaxing atmosphere and a contrast to the normal hospital working environment. Luminaires should be decorative but reasonably easy to clean, and selected to co-ordinate with the furnishing and decor. Switching should be as flexible as practicable to allow partial use of the kitchen and dining areas outside the main working periods, and to facilitate security checks.

12.135 Practical methods of lighting the various functional spaces are contained in the CIBSE Lighting Guide and the Lighting Code. Their location should afford ready access for lamp changing and maintenance, but with the overriding requirement that the recommended standard of illuminance is provided to the task area.

Lighting in food handling areas

12.136 Lighting systems should be of a type which is easily cleaned and maintained. In food preparation areas, they should be sealed to IP41 (BS 4533). Within cooking areas, they should be recessed. Elsewhere they may be surface-mounted.

12.137 Illuminating task areas under extract canopies presents a particular problem. It is often difficult to illuminate adequately the equipment under a canopy using externally located luminaires, but the temperature and humidity within the canopy may have a detrimental effect on the performance of internally located luminaires. At high temperatures the efficiency of fluorescent lamps is lowered, the life of control gear may be seriously reduced, and plastic diffusers may soften and deform. Additionally, luminaires under exhaust canopies must be vapour-proof and suitable for frequent cleaning. If the canopy is constructed using wired-glass, the installation of internally mounted luminaires is unnecessary and should be avoided. In all cases the suitability of the luminaires for the ambient conditions should be confirmed with the manufacturer.

12.138 Totally enclosed fluorescent luminaires conforming to IP44 (BS 4533) should be located on the perimeter of the canopy. If this arrangement is not practical, internally mounted bulkhead luminaires should be used. In all cases the suitability of the luminaires should be confirmed with the manufacturer.

Lighting in refrigerated stores

12.139 Fluorescent luminaires used in refrigerated stores must be suitable for low-temperature operation. Because these special fittings may still take several minutes to reach full output, they should normally be time-switch controlled to suit local working arrangements.Where such luminaires add significantly to the cooling load, however, it may be appropriate to control them via an automatic door switch. The use of mineral-insulated PVC-sheathed cables will avoid the condensation problems usually associated with the conduit systems in this situation. Lighting controls and power outlets should be located outside cold rooms.

12.140 Luminaires which are controlled by automatic door switches should incorporate manual override. The manual override inside the store should incorporate a neon light to indicate its location in an emergency. An external light should indicate when the internal light is on.

12.141 Below minus 10°C, fluorescent luminaires are unsuitable and tungsten lamps should be used.

Main entrance security systems

12.142 The main entrance should be controlled by a door security and/or closed-circuit television surveillance system which provides for verbal communication with, and an electro-magnetically operated door lock to be controlled from, the reception desk.

12.143 Further guidance is contained in Scottish Office PAN 46 Planning for Crime Prevention, and NAHAT Security Manual.

Security alarm

12.144 The CFPU and end kitchen should be provided with a security system covering all entrance doors and the liquid nitrogen storage compound. The system should be connected to the common alarm system or, in the case of the end kitchen, to a continuously manned location.

Telephones

12.145 Central telephone facilities for internal and external calls will normally be available and should be extended to serve this department. Telephones in food handling areas should be wall-mounted and preferably "hands-free".

12.146 Coin and/or card operated payphones, depending on local policy, should be provided in the entrance lobby.

12.147 Further guidance on telephone systems is contained in HBN 48 – 'Telephone services' and HTM 2055 – 'Telecommunications (telephone exchanges)'.

Data links

12.148 Conduits will be required for cables to interconnect electronic equipment. The extent to which these conduits should link all workstations in this department and the main hospital system or elsewhere will depend on the local policy for automatic data processing.

12.149 Data links should also be provided in the CFPU. Food ordering, storage, storage temperatures etc will be carried out by computer data recording.

Clocks

12.150 Clocks may be of impulse, synchronous or battery/quartz type.

Lightning protection

12.151 Protection of the building against lightning should be provided in accordance with HTM 2007 and BS 6651: 1992.

Internal drainage

General

12.152 The primary objective is to provide an internal drainage system which:

a. uses the minimum of pipework;

b. remains water and air tight at joints and connectors;

c. is sufficiently ventilated to retain the integrity of water seals.

Design parameters

General areas

12.153 The design should comply with the relevant British Standards and Codes of Practice, including BS 5572, and the current building regulations. Recommendations for spatial and access requirements for public health engineering services are contained in Engineering Data Sheet EA5.

12.154 The gradient of branch drains should be uniform, and adequate to convey the maximum discharge to the stack without blockage. Practical considerations, such as available angles of bends, junctions and their assembly, as well as space considerations, usually limit the minimum gradient to about 1:50 (20 mm/m). For larger pipes, for example 100 mm diameter, the gradient may be less, but this will require workmanship of a high standard if an adequate self-cleaning flow is to be maintained. It is not envisaged that pipes larger than 100 mm diameter will be required within inter-floor or ground-floor systems serving this department.

Food processing and cooking areas

12.155 Where substantial quantities of kitchen effluent are to be discharged, early discussions should be held with the local water authority, who should be informed of the peak and average discharge volumes.

12.156 The drainage system should be separate from any undertaking other than food production and should serve only the end kitchen or CFPU. Connections with the main drainage should be made well clear of the building to avoid the risk of cross-contamination.

12.157 An efficient and trouble-free drainage installation is particularly essential for the catering department and, since food preparation areas in the kitchens are ultimately linked to a common drainage system serving the entire hospital, the only preventative measures to avoid cross-contamination are those based on good design. The drainage from equipment and appliances should be self-cleansing, quiet in operation, and should not allow air from the installation to enter the premises. To avoid the risk of cross-contamination arising from the backing-up of discharges caused by blockages in other departments, the kitchen drainage should normally operate as a discrete installation within the building. Junctions with the main

drainage should be made well clear of the building precincts.

12.158 The layout of kitchens usually precludes the close grouping of drainage inlets. The retention of water seals in traps is, however, essential and can be achieved by providing an adequate drain ventilation system which, by allowing air movement, maintains pressure fluctuations within an acceptable range. Such provision needs careful detailing, particularly where dwarf walls make routing of drain vents difficult to accommodate. Self-cleansing tubular traps of uniform bore, with a 75 mm water seal, should be used and these should incorporate a readily accessible means of disconnection and inspection.

12.159 The layout of the system should be such that all drains can be rodded from outside the building. Where this is not practical, inspection chambers, within manholes incorporating single-seal covers, must be located outside food processing areas and preferably in corridors.

12.160 In kitchens the risk of blockages is increased by the high proportion of grease and suspended solids in the effluent. All parts of the installation should be accessible for commissioning and periodic inspection, and to clear a blockage in an emergency. For the latter it is preferable to locate maintenance access points above the spill-over level of equipment, and where floor drains are installed this will be above floor level. Such access points, however, are of little use if located below the floor slab, in false ceilings for example, which would necessitate entry into other departments and create a nuisance if spillage should occur. Drainage manholes should not be located in the immediate vicinity of food preparation and cooking areas. Where manholes are unavoidable within the kitchen area, sealed junction fittings and air-tight flush manhole covers should be used to prevent ingress of air and egress of smells from the drainage installation. Alternatively, double-cover manholes should be used.

12.161 Grease traps provided for single appliances will require regular cleaning. The enzyme-activated type will also require regular recharging. They should be located outside the building. The system should be designed to ensure appropriate segregation of waste and proper operation of grease traps.

12.162 Surplus cleaning water should be removed by suction floor-cleaning machines. Floor channels and collection points, draining to gullies, should be avoided; but where necessary, for boiling pans and the like, proprietary stainless steel systems should be used. However, project teams should exercise extreme caution in the choice of system. Some systems require the water seal to be removed for cleaning, providing an entry route for rodents and causing sewer gas to vent into the cooking area. Condensate from mechanical blast chillers should be collected.

12.163 Equipment should be movable. Sinks should therefore discharge into raised, non-splash, stainless steel trapped tundishes.

12.164 Drains from food macerators should have short direct branches preferably into a primary drain receiving other high volume discharges upstream from the connection. It may be necessary to obtain the agreement of the local water company before installation (refer also to paragraph 3.11). Vegetable paring machines should be fitted with waste dilution chambers to avoid blockages from starch residues.

12.165 Equipment drainage outlets should not be connected directly to the drain but should discharge via a hose or tundish over a drainage channel or gully, but because of cleaning problems the provision of floor channels and gullies should be minimised. Where used under boiling pans and similar equipment, channels should be laid to positive falls, with the gratings level. Gratings should be easily removable and have a corrosion-resistant and non-slip finish. The need for floor channels will also be determined by the type of floor cleaning equipment likely to be used. Equipment of the power fitting type will necessitate a greater provision of channels and drainage points, which consequently may influence the floor thickness.

12.166 The materials specified for drainage systems should be capable of long life under sustained conditions of use. Copper and cast iron for above-ground, and vitrified clay or cast-iron for below-ground use have been proved capable of withstanding the relatively high discharge temperatures with negligible thermal movement, and have resistance to impact during rodding operations as well as being fire-resistant.

12.167 Testing and commissioning should include:

- freedom from obstruction test, by the use of a ball inserted into the drain or other suitable method, to prove that no obstruction is present;
- water or air tests as appropriate;
- discharge tests on all appliances, with appropriate appliances operating simultaneously, to test for seal loss.

13.0 Cost information

Introduction

13.1 For all types of health building, it is important that building costs and revenue expenditure are kept as low as possible and consistent with acceptable standards. In applying the guidance in this document to determine a detailed design, the need for economy should always be of prime concern and the activities should be carefully considered so that, where appropriate, space can be shared for similar activities which are programmed to take place at different times. The solution should not be detrimental to the proper functioning of the spaces involved nor to the needs of the users. Within this general context, Health Building Notes provide a synopsis of accommodation for health buildings which the Department of Health recommends for the provision of a given service.

Departmental Cost Allowance Guides

13.2 Departmental Cost Allowance Guides (DCAGs) related to this HBN are officially notified in 'Quarterly Briefing' published by NHS Estates. A full listing of all DCAGs is listed in the DCAG Database – a hard copy of which, together with some guidance notes, can be obtained from NHS Estates.

13.3 The attention of the project team is drawn to guidance given in the Capital Investment Manual (Business Case Guide) published by The Stationery Office. This publication seeks to reflect the important changes that have taken place over recent years, both with the introduction of the NHS reforms and with the changing patterns of healthcare delivery. This new process is intended to reduce unnecessary and often expensive planning work which may subsequently prove to be abortive, and emphasises the necessity for a sound business case in support of the capital expenditure involved. The Capital Investment Manual also states that the Capital Works estimate of the intended scheme must be based on, wherever applicable, industry norms such as the DCAGs plus a percentage to cover for on-costs.

13.4 The DCAG for the CFPU reflects the accommodation related to a stand-alone new-build unit. If the unit is built within the grounds of other health buildings, the sharing of engineering services may be possible. The DCAGs for all other departments within this HBN reflect the total building and engineering requirements related to a new-build catering facility in an acute general hospital where the common use of services will be available. The project team's attention is drawn to the fact that, should the preferred option be to provide a stand-alone catering department, additional facilities to those described in this HBN may be necessary. Accordingly, suitable amendments should be made to both the schedule of accommodation and the relevant DCAGs published.

13.5 It is also important to bear in mind that an allowance for on-costs should be added to the DCAGs for this unit, this element being for external works, external engineering services and abnormals etc. The abnormals will largely be determined by the characteristics of the site, such as an inner-city location or the condition and type of the existing building if refurbishment is the only option.

13.6 It is also important that project teams assess at the earliest opportunity all the likely on-cost implications of individual sites and schemes.

13.7 DCAGs are exclusive of VAT, building and planning fees and all local authority charges and are based on a Locational Factor of 1.

13.8 Spaces are also described within this Note for ward pantries and food courts; however, no DCAGs are to be produced for these areas. Ward pantries are specific to hospital wards, and cost allowances for acute wards are included within the DCAG Database. Food courts are spaces totally dependent upon individual requirements and therefore no specific guidance on space allocation or cost information is to be produced.

Locational factors

13.9 Locational factor adjustments may be applied to the Works Cost (that is, the total of the DCAGs plus the requisite on-costs) to take into account the local market conditions. For further information regarding these please refer to the Regional Location factors in 'Quarterly Briefing' published by NHS Estates.

Functional units

13.10 The functional unit for the CFPU is based on the unit being capable of producing approximately 5500 kg of food per day.

The functional units for the end kitchen and conventional kitchen are based on 600 and 1200 midday meals served each day.

The functional units for the restaurant,servery and coffee lounge are based on the provision of 300 and 600 midday meals served each day.

The activity spaces and areas used for costing the functional units are listed in the schedules of accommodation at the end of this chapter.

Essential complementary accommodation (ECA)

13.11 This comprises activity spaces which are essential to the running of the unit, but which in certain circumstances may be available in a convenient location elsewhere. The amount of ECAs which will need to be provided as part of an individual project will therefore vary according to the extent of the provision elsewhere. The ECAs costed in this HBN are listed in the schedules of accommodation at the end of this chapter.

Optional accommodation and services (OAS)

13.12 This Note, where appropriate, draws attention to project options for providing services or facilities, including the likely cost implications. This information will enable the project manager to select the solution which is most suitable to their needs. The optional accommodation and services (OAS) spaces costed in this Note are listed in the schedules of accommodation at the end of this chapter.

13.13 The size of bulk stores in the CFPU will vary according to the local policy on goods supply and storage; for example, where supplies are delivered every other day rather than every day, a larger bulk store will be required. An allowance for bulk storage is provided in the schedule of accommodation. However, where local policy requires extra storage space, project teams may consider the extra allowance included in optional accommodation and services as a guide.

13.14 The optional accommodation associated with the conventional kitchen has been divided into:

a. rooms which are optional only to a 600 meal kitchen;

b. rooms which are optional only to a 1200 meal kitchen; and

c. rooms which are optional to either a 600 or 1200 meal kitchen.

Dimensions and areas

13.15 In determining spatial requirements, the essential factor is not the total area provided but the critical dimensions, that is, those dimensions critical to the efficient functioning of the activities which are to be carried out. To assist project teams in preparing detailed design solutions for the rooms and spaces, studies have been carried out to establish dimensional requirements in the form of critical dimensions. The results of these studies appear as ergonomic diagrams in Health Building Note 40 Volumes 1–4.

13.16 For development planning and at the earliest stage of a design, it may be convenient for designers to have data available which will enable them to make an approximate assessment of the sizes involved. For this reason, the areas prepared for the purpose of establishing the cost allowances are listed in the schedules of accommodation at the end of this chapter.

13.17 It is emphasised that the areas published do not represent recommended sizes, nor are they to be regarded in any way as specific individual entitlements.

13.18 Efficient planning of the building may also necessitate variation of areas; for instance, in the refurbishment or conversion of older property:

a. rooms tend to be larger than the recommended area;

b. some rooms may be too small or in the wrong location for efficient use;

c. circulation space tends to form a larger than normal proportion of the total area.

Circulation

13.19 Space for circulation, as well as including space for all corridors, also includes a 5% allowance for planning, and a 3% addition for an engineering zone adjacent to the external walls, all small vertical ducts and spaces occupied by partitions and walls. These areas are all included and therefore costed in the DCAGs.

13.20 It is also important to remember that the circulation figures included in the DCAGs for this HBN are those anticipated for new purpose-built premises with no constraints. Where constraints are encountered, for example in refurbishment or conversion of older types of property, this circulation figure would be likely to increase accordingly; therefore some adjustment may be necessary to the circulation figure.

Communications

13.21 Staircases and lifts are not included in the DCAGs relevant to this unit. Costs related to these elements, along with a suitable space standard allowance, should be made in the on-costs. For further reference please refer to HBN 40 Volume 4, "Circulation areas".

Land costs

13.22 As is the norm for DCAGs, costs are exclusive of all land costs and associated fees. However, the project team's attention is drawn to the fact that costs associated with these should be included in the Business Case submission, all as detailed in the Capital Investment Manual, and could therefore be an important part of the overall cost viability of the scheme.

Engineering services

13.23 The following engineering services, as described in the engineering chapter and exemplified in the Activity Data, are included in the cost allowances. Primary engineering services are assumed to be conveniently available at the boundary of the unit.

a) Mechanical services	CFPU	Conventional kitchen	End kitchen
Heating	Where appropriate, low pressure hot water system with thermostatic radiator controls, maximum touch temperature 43°C	Where appropriate, low pressure hot water system with thermostatic radiator controls, maximum touch temperature 43°C	Where appropriate, low pressure hot water system with thermostatic radiator controls, maximum touch temperature 43°C
Ventilation	Mechanical supply and extract to meet CFPU and functional requirements	Mechanical supply and extract to meet conventional kitchen and functional requirements	Mechanical supply and extract to meet end kitchen and functional requirements
Cold water services	Supplied directly to CFPU and hose reels. Storage tank(s) are included	Centrally supplied to service points including drinking water and hose reels. Storage tank(s) are not included	Centrally supplied to service points including drinking water and hose reels. Storage tank(s) are not included

b) Electrical services	CFPU	Conventional kitchen	End kitchen
Distribution switchboard	•	•	•
Building management system	•	•	•
Lighting systems	Special lighting over cooking areas. General lighting as required by tasks. Fluorescent, tungsten luminaires as appropriate	Special lighting over cooking areas. General lighting as required by tasks. Fluorescent, tungsten luminaires as appropriate	General lighting as required by tasks. Fluorescent, tungsten luminaires as appropriate
Supplementary equipotential earth bonding	•	•	•

Standby and safety installations	Stand-alone	From main hospital site	From main hospital site
Alarm system	Stand-alone for fire and security	From hospital site fire and security	From hospital site fire and security
Clocks	Impulse, synchronous or battery/quartz type	Impulse, synchronous or battery/quartz type	Impulse, synchronous or battery/quartz type
Telephone	Conduits, cabling and outlets, but excluding instruments (handsets, payphones etc)	Conduits, cabling and outlets, but excluding instruments (handsets, payphones etc)	Conduits, cabling and outlets, but excluding instruments (handsets, payphones etc)
Data transmission	Conduits only	Conduits only	Conduits only

Note: **3-phase electrical supply for ward pantry**

Equipment (Group 1)	**CFPU**	**Conventional kitchen**	**End kitchen**
	Refrigeration plant Liquid nitrogen plant Blast chillers Cryogenic chillers (if used) Water boiler Cooking equipment eg ovens, boiling pans, bratt pans, steamers and combi cookers etc. Washers eg tray, dish and glass.	Refrigeration plant (if fitted) Water boiler Cooking equipment eg ovens, boiling pans, bratt pans, steamers and combi cookers etc. Washers eg tray, dish and glass.	Refrigeration plant (if fitted) Cooking equipment eg ovens, boiling pans, bratt pans, steamers and combi cookers etc. Washers eg tray, dish and glass.

Schedules of Accommodation

13.24 The following schedules are based on the text in Chapters 4, 7, 8 and 9 and are illustrative of the acceptable accommodation for the functional units detailed.

Central Food Production Unit

Para. No.	Activity Space	Space Area m²	1 Unit Qty No.	1 Unit Total Area m²
	Delivery Bay			
4.13	Delivery/Check weight bay	16.00	1	16.00
4.14	WC – type 1	2.00	1	2.00
4.15	Returns empties store	10.00	1	10.00
4.16	Storekeeper's office – type 4	7.00	1	7.00
4.17	Dry bulk store	102.00	1	102.00
4.20	Ingredient control room	21.50	1	21.50
4.21	Ingredients transfer lobby	6.50	1	6.50
	Cold Stores			
4.23	Cold store, fats and cheese	6.00	1	6.00
4.24	Vegetable cold store	21.00	1	21.00
4.25	Raw meat and poultry cold store	21.00	1	21.00
4.26	Cooked and prepared food cold store	13.00	1	13.00
4.27	Raw frozen food store	13.00	1	13.00
4.28	Raw frozen meat, poultry and fish store	13.00	1	13.00
4.29	Frozen pre-cooked food store	26.50	1	26.50
4.30	Hygiene control bay	3.50	1	3.50
	Food Preparation Rooms			
4.33	Raw meat/fish/poultry preparation room	38.50	1	38.50
4.34	Vegetable preparation room	38.00	1	38.00
4.36	Salad and cold food preparation room	35.00	1	35.00
4.37	Pastry and hot sweet preparation room	37.50	1	37.50
4.38	Cold sweet preparation room	28.00	1	28.00
4.39	Test and quality assurance kitchen	10.00	1	10.00
4.40	Hygiene control bay	3.50	1	3.50
4.41	Cooking area	186.00	1	186.00
4.52	Head chef's office – type 3	9.00	1	9.00
4.53	Portioning area + blast chilling/freezing bay	92.00	1	92.00
4.62	Bulk chilled food store	72.00	1	72.00
4.64	Frozen meal store	21.00	1	21.00
	Meal Despatch			
4.67	Chilled assembly & despatch bay	33.50	1	33.50
4.69	WC – type 1	2.00	1	2.00
4.70	Container returns bay	31.50	1	31.50
4.71	Pre-wash container park	13.50	1	13.50
4.72	Central wash up room	105.00	1	105.00
4.73	Rack/container wash	8.50	1	8.50
	Offices and Staff Accommodation			
4.83	Main entrance and lobby	7.00	1	7.00
4.84	Manager and assistant manager's office	11.00	1	11.00
4.85	Control/clerks' office - type 5 & 6 - 2 positions	13.50	1	13.50
4.86	Quality assurance control office	13.50	1	13.50
4.87	Male staff change 20 staff	10.00	1	10.00
4.87	Shower - type 4 (male staff)	2.50	2	5.00
4.87	WC – type 1 (male staff)	2.00	1	2.00
4.87	Female staff change – 20 staff	10.00	1	10.00
4.87	Shower – type 4 (female staff)	2.50	2	5.00
4.87	WC – type 1(female staff)	2.00	1	2.00
4.88	Staff rest room and beverage bay	36.00	1	36.00
4.90	First aid room	7.00	1	7.00
	Support Spaces			
4.74	General store (Detergents)	6.00	1	6.00
4.75	Cleaners room – kitchen area	7.00	3	21.00
4.75	Cleaners room – administration area	7.00	1	7.00
4.76	Clean linen and clothing store	8.00	1	8.00
4.77	Dirty linen store/ Disposal hold	3.00	1	3.00
4.78	Electrical switch room	6.00	1	6.00
4.79	Gas meter room	5.00	1	5.00
4.81	Refuse store	16.00	1	16.00
	Plant room	50.00	1	50.00

Nett Total		1,290.5
Planning	5%	64.5
Sub-Total		1,355.0
Engineering Total	3%	40.7
Circulation etc	15%	203.3
Total		1,598.9
Departmental Total		**1,600**

Central Food Production Unit

Essential Complementary Accommodation

Para No.	Activity Space	Space Area	Planning	Sub-Total	Engineering	Circulation	Total
4.91	Seminar room	20.00	1.00	21.00	0.63	3.15	25.00

Optional Accommodation and Services

Para No.	Activity Space	Space Area	Planning	Sub-Total	Engineering	Circulation	Total
4.17	Dry bulk store	102.00	5.10	107.10	3.21	16.07	126.50
4.62	Bulk chilled food store	72.00	3.60	75.60	2.27	11.34	89.00

End kitchen

Para. No.	Activity Space	Space Area	600 meals Qty	600 meals Total Area	1200 meals Qty	1200 meals Total Area
	Delivery Area					
7.2	Delivery bay		1	12.50	1	23.00
7.3	Storekeepers office – type 4	7.00	1	7.00	1	7.00
7.4	Empty returns store		1	8.00	1	16.00
7.5	CFPU returns bay		1	9.00	1	18.00
	Food Stores					
7.6	Provisions store		1	31.50	1	49.00
7.7	Bread store		1	3.50	1	7.00
7.8	Diet food store	3.50	1	3.50	1	3.50
7.9	Dairy products cold store	6.00	1	6.00	1	6.00
7.1	Frozen food store	9.00	1	9.00	1	9.00
7.11	Bulk chilled food store		1	35.00	1	70.00
7.12	General cold store	6.00	1	6.00	1	6.00
	Food Preparation Rooms					
7.13	Hygiene control bay	6.50	1	6.50	1	6.50
7.14	Salad and cold food preparation room	17.00	1	17.00	1	17.00
7.15	Diets preparation, cooking and chilling room	17.00	1	17.00	1	17.00
	Meal Despatch					
7.16	Patients food service room		1	79.00	1	91.00
7.19	Clean ward trolley room		1	20.00	1	40.00
7.2	Staff food service room		1	35.00	1	47.00
7.21	Return ward trolley park		1	15.50	1	31.00
7.22	Central wash-up/pot wash bay		1	132.50	1	141.00
7.23	Trolley wash bay	7.00	1	7.00	1	7.00
	Offices and Staff Accommodation					
7.32	Entrance lobby	7.00	1	7.00	1	7.00
7.33	Catering managers office – type 3	9.00	1	9.00	1	9.00
7.34	Male staff change – 10 staff	7.50	1	7.50	-	-
7.34	Male staff change – 20 staff	10.00		-	1	10.00
7.34	Male staff - shower – type 4	2.50	1	2.50	2	5.00
7.34	Male staff – wc – type 1	2.00	2	4.00	2	4.00
7.34	Female staff change – 10 staff	7.50	1	7.50	-	-
7.34	Female staff change – 20 staff	10.00		-	1	10.00
7.34	Female staff – shower – type 4	2.50	1	2.50	2	5.00
7.34	Female staff – wc – type 1	2.00	2	4.00	2	4.00
7.36	Staff rest room		1	16.00	1	22.50
	Support Spaces					
7.25	Detergent store	3.50	1	3.50	1	3.50
7.26	Cleaners room	7.00	1	7.00	1	7.00
7.27	Clean linen/uniform store	3.50	1	3.50	1	3.50
7.28	Dirty linen/uniform store	3.50	1	3.50	1	3.50
7.29	Electrical switch room	4.00	1	4.00	1	4.00
7.3	Gas meter room	5.00	1	5.00	1	5.00
7.31	Refuse store		1	6.00	1	12.00
	Nett Total			553.0		727.0
	Planning		5%	27.7	5%	36.4
	Sub-Total			580.7		763.4
	Engineering Total		3%	17.4	3%	22.9
	Circulation etc		15%	87.1	15%	114.5
	Total			685.2		900.8
	Departmental Totals			**685**		**900**

Conventional kitchen

Para. No.	Activity Space	Space Area m²	600 meals Qty	600 meals Total Area m²	1200 meals Qty	1200 meals Total Area m²
	Delivery Bay					
	Check weight room	4.00	1	4.00	1	4.00
	General Stores					
	Store – daily use		1	10.00	1	14.50
	Equipment store	7.00	1	7.00	1	7.00
	Dry disposables store		1	3.50	1	6.00
	Bulk refuse store	10.00	1	10.00	1	10.00
	Detergents store		1	4.50	1	6.00
	Cold Stores					
	Vegetable store		1	10.00	1	11.50
	Meat cold room	6.00	1	6.00	1	6.00
	Kitchen cold room		1	7.00	1	9.00
	Kitchen frozen food store		1	6.00	1	9.00
	Food Preparation Rooms					
	Vegetable preparation		1	14.00	1	17.00
	Meat fish & poultry preparation		1	15.00	1	20.00
	General preparation		1	13.00	1	17.00
	Pastry preparation & cooking		1	25.00	1	35.00
	Diet preparation and cooking	17.00	1	17.00	1	17.00
	Cooking area		1	90.00	1	120.00
	Pan wash	15.00	1	15.00	1	15.00
	Kitchen manager's office – type 4	7.00	1	7.00	1	7.00
	Meal Despatch Rooms					
	Patients tray service	79.00	1	79.00	1	79.00
	Patients tray preparation		1	9.50	1	11.50
	Meal service supervisor's office – type 4	7.00	1	7.00	1	7.00
	Trolley parking – dirty		1	7.50	1	10.00
	Trolley wash	7.00	1	7.00	1	7.00
	Trolley parking – clean		1	20.00	1	35.00
	Central wash		1	40.00	1	67.00
	Offices and Staff Accommodation					
	Catering manager's office – type 3	9.00	1	9.00	1	9.00
	Catering office – clerk's – type 4	7.00	1	7.00	1	7.00
	Staff rest room		1	16.00	1	22.50
	Male staff change – 10 staff	7.50	1	7.50	-	-
	Male staff change – 20 staff	10.00		-	1	10.00
	Male staff – shower – type 4	2.50	1	2.50	2	5.00
	Male staff – wc – type 1	2.00	2	4.00	2	4.00
	Female staff change – 10 staff	7.50	1	7.50	-	-
	Female staff change – 20 staff	10.00		-	1	10.00
	Female staff – shower – type 4	2.50	1	2.50	2	5.00
	Female staff – wc – type 1	2.00	2	4.00	2	4.00
	Support Spaces					
	Cleaners room	7.00	1	7.00	1	7.00
	Electric switch room	4.00	1	4.00	1	4.00
	Gas meter room	5.00	1	5.00	1	5.00
	Nett Total			510.0		640.0
	Planning		5%	25.5	5%	32.0
	Sub-Total			535.5		672.0
	Engineering Total		3%	16.1	3%	20.2
	Circulation etc		15%	80.3	15%	100.8
	Total			631.9		793.0
	Departmental Totals			**630**		**795**

Conventional kitchen

Optional Accommodation and Services

Para. No.	Activity Space	Space Area	Planning	Sub-Total	Engineering	Circulation	Total Area
	600 Meal Kitchen						
	Kitchen chilling room	8.00	0.40	8.40	0.25	1.26	10.00
	General bulk store	55.00	2.75	57.75	1.73	8.66	68.00
	Bulk Bread store	3.00	0.15	3.15	0.09	0.47	3.50
	Bulk frozen food store	5.50	0.28	5.78	0.17	0.87	7.00
	1200 Meal Kitchen						
	Kitchen chilling room	10.00	0.50	10.50	0.32	1.58	12.50
	General bulk store	100.00	5.00	105.00	3.15	15.75	124.00
	Bulk Bread store	5.00	0.25	5.25	0.16	0.79	6.00
	Bulk frozen food store	8.50	0.43	8.93	0.27	1.34	10.50
	600 and 1200 Meal Kitchen						
	Kitchen blast chilling	5.50	0.28	5.78	0.17	0.87	7.00
	Bulk milk-fats-cheese store	4.00	0.20	4.20	0.13	0.63	5.00

Restaurant and coffee lounge

			300 meals		600 meals	
Para. No.	Activity Space	Space Area	Qty	Total Area	Qty	Total Area
9.3	Entrance lobby		1	16.00	1	20.00
9.4	Restaurant servery		1	65.00	1	100.00
9.9	Food store		1	5.00	1	7.50
9.14	Restaurant		1	100.00	1	180.00
9.15	Coffee lounge servery		1	20.00	1	30.00
9.16	Coffee lounge		1	100.00	1	190.00
9.17	Linen and disposable goods store	4.50	1	4.50	1	4.50
	Cleaners room	7.00	1	7.00	1	7.00
	Electric switch cupboard	2.00	1	2.00	1	2.00
	Nett Total			319.5		541.0
	Planning		5%	16.0	5%	27.1
	Sub-Total			335.5		568.1
	Engineering Total		3%	10.1	3%	17.0
	Circulation etc		27.5%	92.3	27.5%	156.2
	Total			437.8		741.3
	Departmental Totals			**440**		**740**

Restaurant and coffee lounge

Essential Complementary Accommodation

Para No.	Activity Space	Space Area	Planning	Sub-Total	Engineering	Circulation	Total
9.18	Supervisor's office – type 4	7.00	0.35	7.35	0.22	2.02	9.50
9.19	Furniture store	12.00	0.60	12.60	0.38	3.47	16.50

14.0 Activity data

Introduction

14.1 Activity DataBase is a computerised information system developed to help project and design teams by defining the users' needs more precisely. This information constitutes the computerised Activity DataBase for Windows, up-dated twice yearly.

14.2 Room Data Sheets record in more detail than is described in this Note, each task or activity that is performed in a particular activity space, together with environmental conditions and the technical data necessary to enable the activities to be performed. Each Room Data Sheet also contains a list of relevant assembly and component codes and descriptions. Room area information is provided in conjunction with a room graphic.

14.3 Assembly Data Sheets provide narrative text and ergonomically arranged graphics to scale relating to one activity. They show equipment fitted or supplies as part of the building, and the necessary engineering terminals.

14.4 Component schedules provide information about the total quantities of group 1, 2 and 3 components for single data sheets or for all data sheets for a department. Group 4 components are not included in the schedule – see paragraph 1.20.

14.5 Activity data is only available in the form of magnetic media, but users may generate paper copies where required.

14.6 Further information about the use and preparation of activity data can be obtained from NHS Estates, Department of Health, 1 Trevelyan Square, Boar Lane, Leeds LS1 6AE.

Activity data applicable to this Note

14.7 The Room Data Sheets recommended for the activity spaces described in this Note are either new sheets, amended ones or ones selected from existing sheets.

14.8 Further activity data sheets may be selected, or drawn up by project teams to their own requirements, for any services not described in the Note.

14.9 In order to ensure consistent and economical provision, variations from the Room Data Sheets recommended for the spaces covered in this Note should be considered only where it has been decided that the function of a space will differ substantially from that described.

14.10 The Room Data Sheets listed in Activity DataBase may not carry a title identical to the activity spaces detailed in this Note. Use of the appropriate code number will, however, result in the correct activity space being accessed.

Appendix 1 – Glossary

Blast chiller
Equipment designed to cool food rapidly after cooking or heating, incorporating the mechanical chilling process.

Boiling pans
A range of sizes are available, preferably tilting models with attachments to allow the contents to be poured directly into the Gastronorm containers. Special pans with mechanical scrapers can be used for sauces.

Boiling tables
These may have from four to six burners and are used for cooking small quantities of food.

Bratt pans
These are also known as shallow fryers and can be used for braising, poaching, stewing etc. Tilting models should be chosen.

Central Food Production Unit (CFPU)
The main kitchen in which all food is produced, chilled or frozen, and initially stored.

Combination ovens
The combination oven combines the functions of convection, steaming and baking oven in one unit. They can also be fitted with roll-in-racks.

Convection ovens
These are fan assisted ovens and can have roll-in-racks. They are used for roasting or baking.

Cook-chill
System of food preparation in which food is prepared in advance, to be reheated several days later. Strict control of chilled storage temperature is needed.

Cook-freeze
System of food preparation in which food is prepared in advance and then deep-frozen. If properly packaged the food may be kept for several months with no loss of quality.

Cryogenics
System of refrigeration using injection of liquefied gas into the equipment designed to chill.

Curtilage
The grounds of the hospital.

Dolly
A platform designed to take stacks of baskets or trays fitted with castors to enable them to be wheeled anywhere.

Dunnage battens
Protective barriers applied to surfaces to prevent damage by mobile units.

Euronorm containers
A standard module container size originating in France, and similar to Gastronorm but with varying module sizes. These are smaller than and not compatible with Gastronorm sizes.

Fryers
Deep fat fryers for the CFPU have programmable controls, automatic basket lifts and are used for frying batches of food. They will also require oil filtering equipment which can either be built in with the set of fryers or be a mobile unit.

Gastronorm containers
A worldwide standard size catering container based on a module 530 mm ˜ 325 mm which is called 1/1. Various fractions of this module are available together with the 2/1 double size. Refrigerators, storage racks, trolleys and ovens etc are designed to receive these containers.

Grills and salamanders
These are used for grilling, toasting and browning food. For a CFPU large fast heating element types should be chosen.

Mechanical chilling
Term to describe equipment which, using refrigerant compressor fans and evaporators, chills air which is then blown over food.

Organoleptic
Concerning the aesthetic appeal of food – mainly smell, taste, texture and presentation.

Pass-through
Term to describe equipment where loaded containers, racks or baskets can be placed into a cavity in one direction and removed from the same cavity in another direction.

Pastry oven
This is a multi-deck oven used for baking, each deck having its own control. This oven requires mobile cooling racks for the trays of pastry goods.

Portion control
A standard portion represents the amount of food to be served at a known cost. The use of standard portions will give rise to a consistent quality and quantity.

Potable
Usually related to water supply. Safe to drink and acceptable for use in food preparation.

Reheating/regeneration
The process involving the use of highly developed heating sources capable of raising chilled foods or frozen goods after controlled thawing to a centre temperature of 70°C for two minutes (and the temperature of food not to fall below 63°C before service).

Roll-through
Term to describe equipment where loaded trolleys can be wheeled into a cavity in one direction and removed from the same cavity in another direction.

Slicing machine
Heavy-duty automatic gravity feed slicing machines are used in CFPUs and end kitchens for slicing cooked meat prior to portioning.

Steam ovens
There are two types, the atmosphere type and the high-speed pressure steaming oven. They can be used for cooking batches of food in CFPUs and end kitchens.

Tunnel chiller
Equipment which incorporates a mechanical system for passing food products through the chilling process.

U-factor
Standard classification of thermal insulation.

Appendix II: Ergonomic data sheets

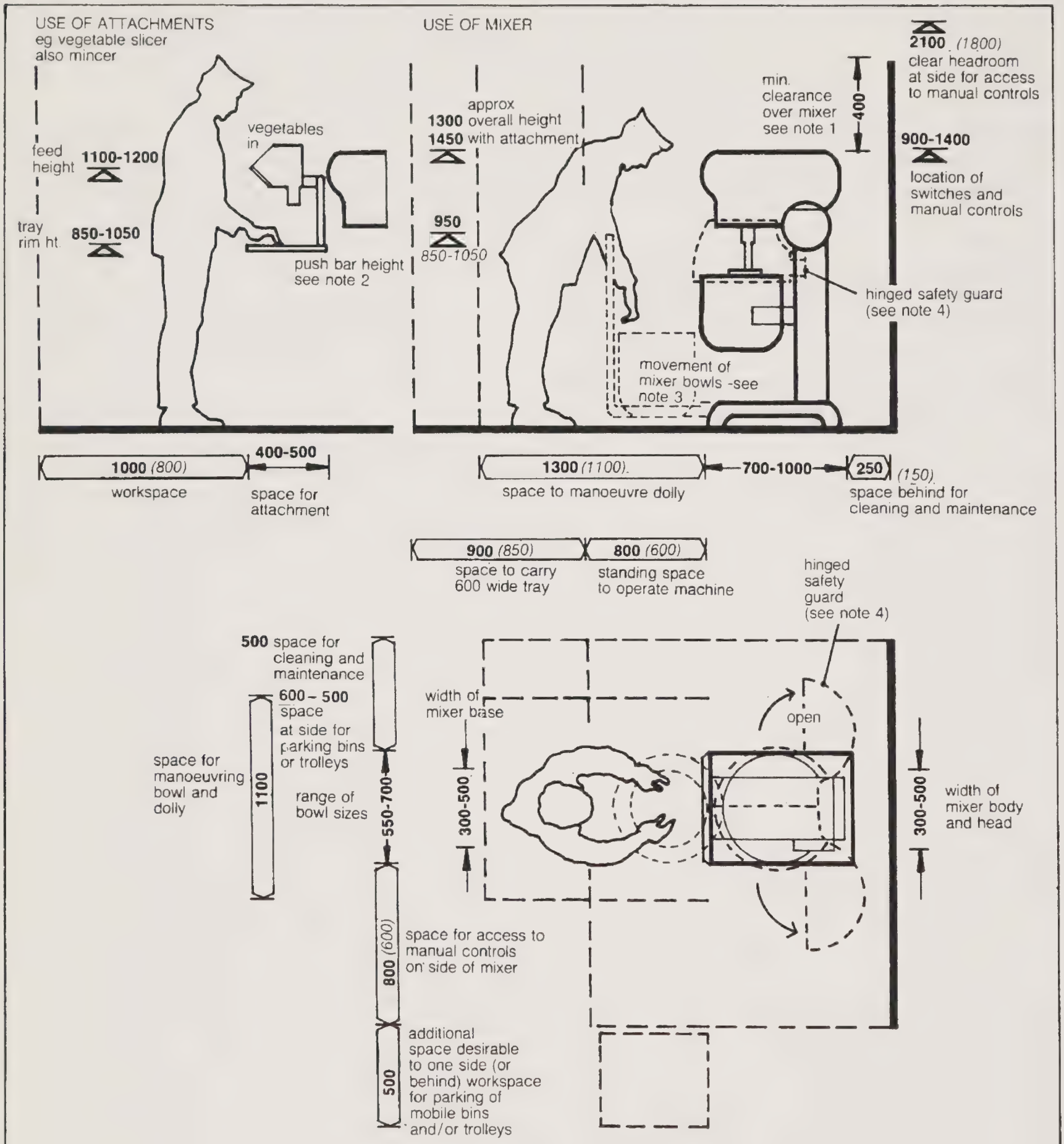
Mixer
Range
Boiling pan
Conveyor (1)
Conveyor (2)
Conveyor (3)
Dishwasher (1)
Dishwasher (2)
Dishwasher (3)
Trolley
Service counter (1)
Service counter (2)
Service counter (3)
Regeneration oven
Hostess regeneration trolley
Combination trolley
Combination trolley

Activities:
Mixing of ingredients (by beating, whipping etc)

NHS Estates Ergonomic data sheet
Component-user data sheet, not to scale

Mixer
20/40/50 Quart/180/365/455 litres

Users:
Catering staff



1350 *(1300)*

Preferred minimum: *Restricted minimum (not recommended for general use: see explanatory notes)*

Notes:

1. This clearance will be inadequate for top fitting attachments available with some models.

2. It is preferable that dollies should be fitted with push bars to eliminate the need for excessive bending.

3. The lifting and moving of large mixing bowls, especially when loaded, should be mechanically aided.

4. All large mixers must be fitted with guards which do not open until moving parts have stopped.

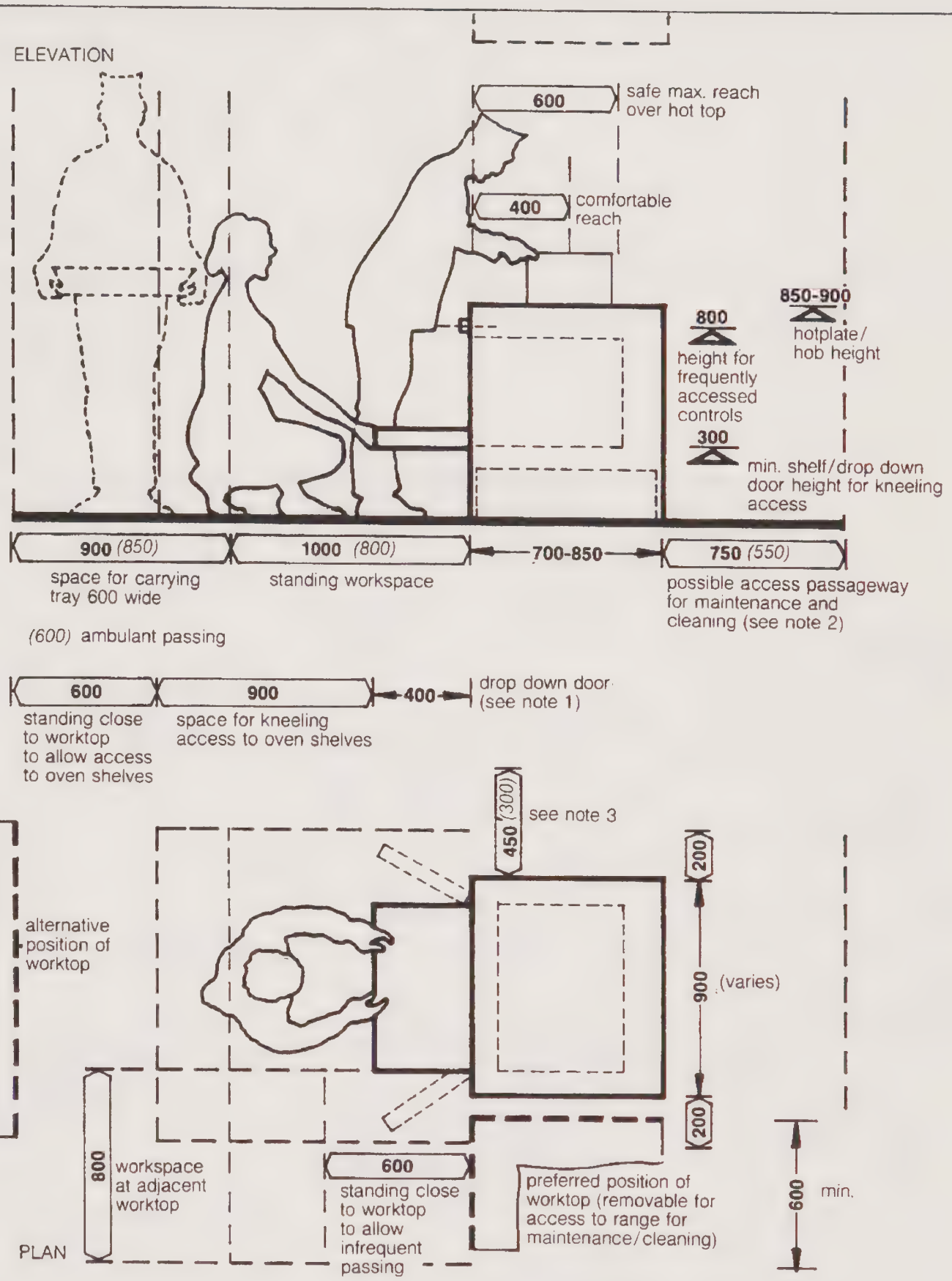
Activities:
General cooking of food.
Maintenance and cleaning of range.

NHS Estates Ergonomic data sheet
Component-user data sheet, not to scale

Range

Heavy duty, gas/electric.

Users:
Catering staff



1350 *(1300)*

Preferred minimum: *Restricted minimum (not recommended for general use: see explanatory notes)*

Notes:

1. Doors — Drop down doors to ovens are preferred to side hinged doors as they allow hot trays etc. to be rested on them for inspection of food, or prior to lifting in and out of oven. (Max. preferred projection of drop down doors - 400).

2. Access to back of range — Where heavily serviced equipment is arranged "back to back" an access passageway for maintenance and cleaning is preferred. Easily removable equipment (e.g. worktops) located adjacent to and/or on the opposite side of the access passageway can improve access for cleaning and maintenance. The restricted width of (550) shown may be hazardous and uncomfortable when the range is hot. The preferred workspace for working at the back of the equipment using large tools in a bent or kneeling posture is 1100 - (restricted workspace 900). The use of hand operated forklifts may also need to be considered for moving the range into, or out of position.

3. Access to side of range — 450 dimension is preferred for cleaning and maintenance, restricted space of (300) can be hazardous when range is hot. Where adjacent equipment is more than 900 high these dimensions should be increased to 500 (350).

4. It is not recommended that shelves or racks be positioned over deep ranges because of the potential danger of reaching over hot range tops.

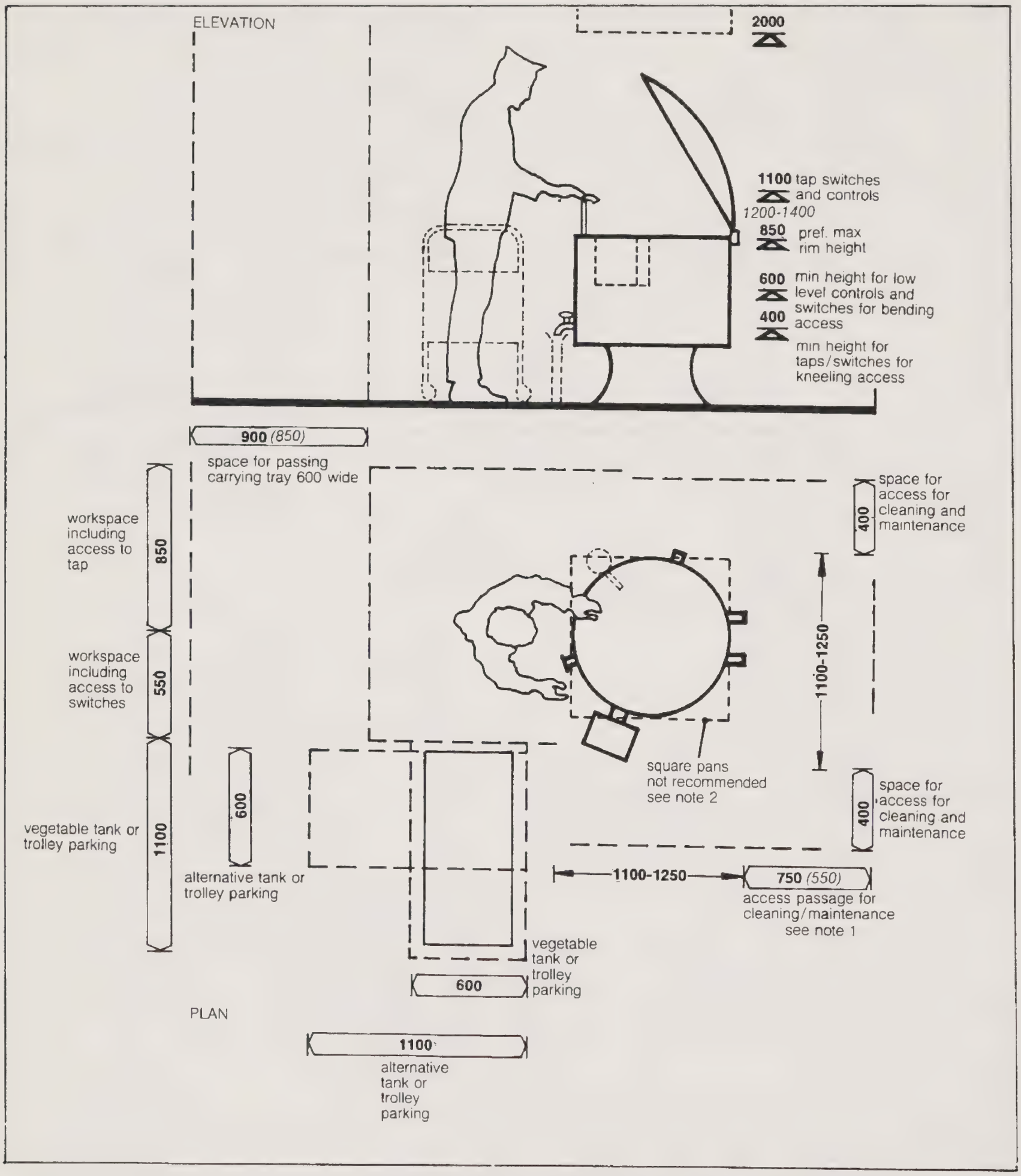
Activities:
Boiling food

NHS Estates Ergonomic data sheet
Component-user data sheet, not to scale

Boiling pan

20 - 30 gallon/90 - 135 litres

Users:
Catering staff



1350 *(1300)*

Preferred minimum: *Restricted minimum (not recommended for general use: see explanatory notes)*

Notes:

1. Access to back of boiling pan - Where heavily serviced equipment is arranged "back to back" an access passageway for maintenance and cleaning is preferred. Easily removable equipment (e.g. worktops) located adjacent to and/or on the opposite side of the access passageway can improve access for cleaning and maintenance. The restricted width of 550 shown may be hazardous and uncomfortable when the equipment is hot. The preferred workspace for working at the back of the equipment using large tools is 1100 (restricted workspace 900).

2. Square pans are not recommended. Operational experience has identified unacceptable difficulties in stirring soups and other liquid preparations. Emptying and cleaning is also more difficult where the pan is not installed in a slightly tilted position.

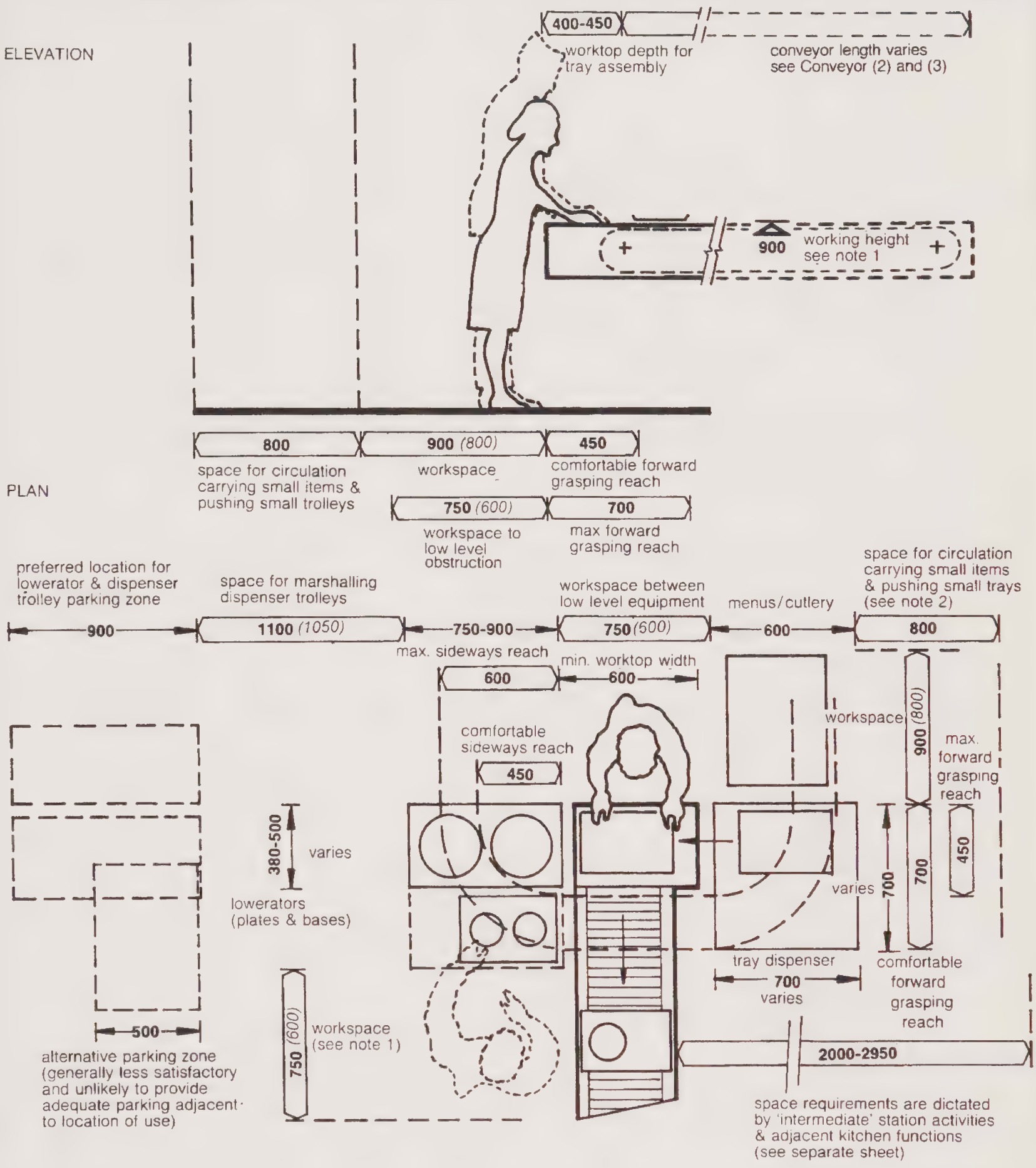
Activities:
Preparing trays, including loading with menu cards, cutlery, heated bases and plates. (see also Conveyor (2) & (3) data sheets)

NHS Estates Ergonomic data sheet
Component-user data sheet, not to scale

Conveyor (1)

Trayed meals

Users:
Catering staff



1350 *(1300)*

Preferred minimum: *Restricted minimum (not recommended for general use: see explanatory notes)*

Notes:

1. Where deep dispensers are used, reach exceeds safe capability of first station operator, a second operator must be introduced.

2. Circulation space must be increased for other traffic conditions.

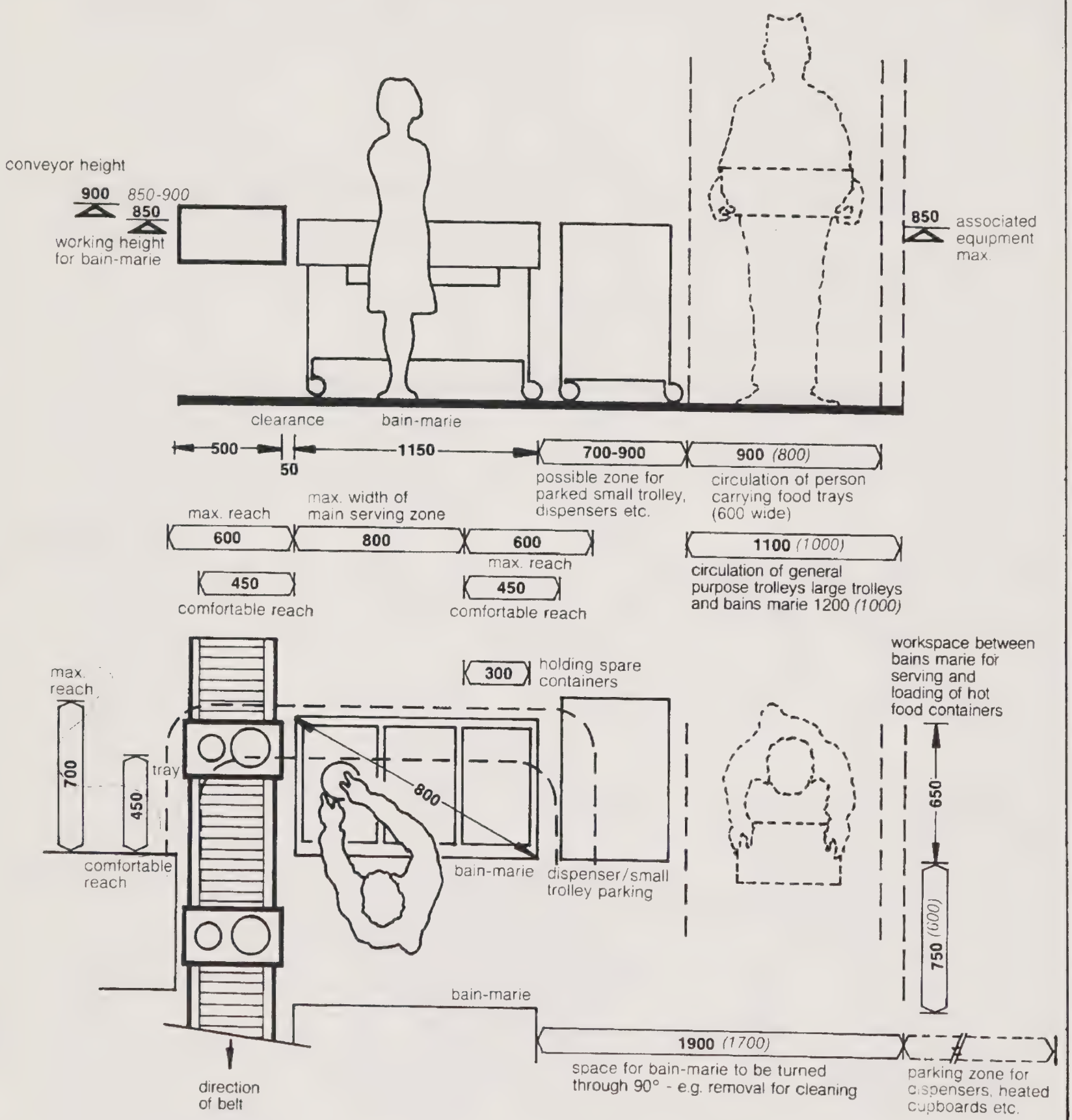
Activities:
Serving food from bain-marie

NHS Estates Ergonomic data sheet
Component-user data sheet, not to scale

Conveyor (2)

Trayed meals

Users:
Catering staff



1350 *(1300)*

Preferred minimum: *Restricted minimum (not recommended for general use: see explanatory notes)*

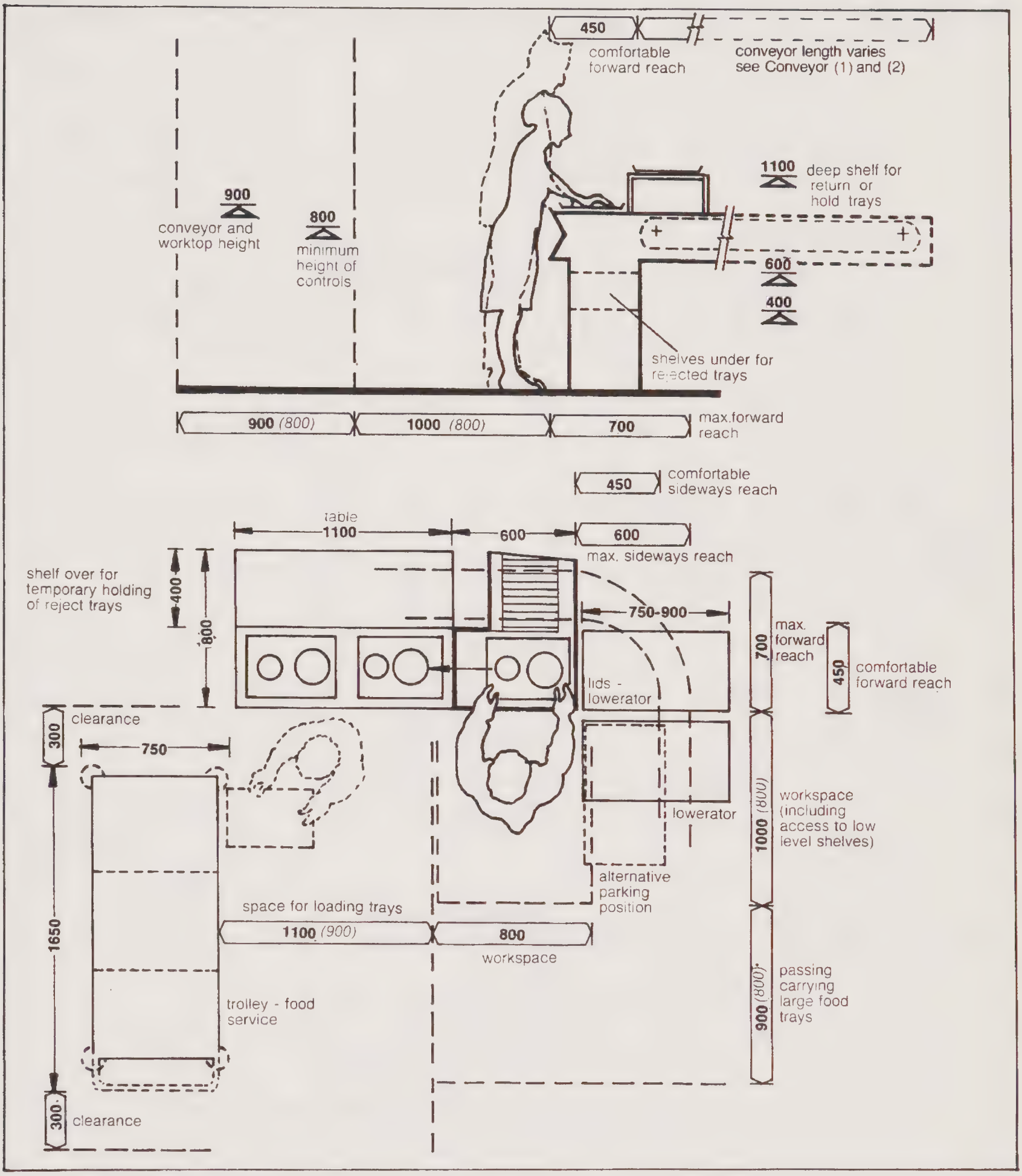
Activities:
Checking trayed meals, placing lids on plates, loading trays into trolleys

NHS Estates Ergonomic data sheet
Component-user data sheet, not to scale

Conveyor (3)

Trayed meals

Users:
Catering staff



1350 *(1300)*

Preferred minimum: *Restricted minimum (not recommended for general use: see explanatory notes)*

Notes:

1. Activity dimensions given relate to worktop level dispenser type equipment only. Where conventional trolleys are used additional space for bending and kneeling access to lower shelves must be provided.

Activities:

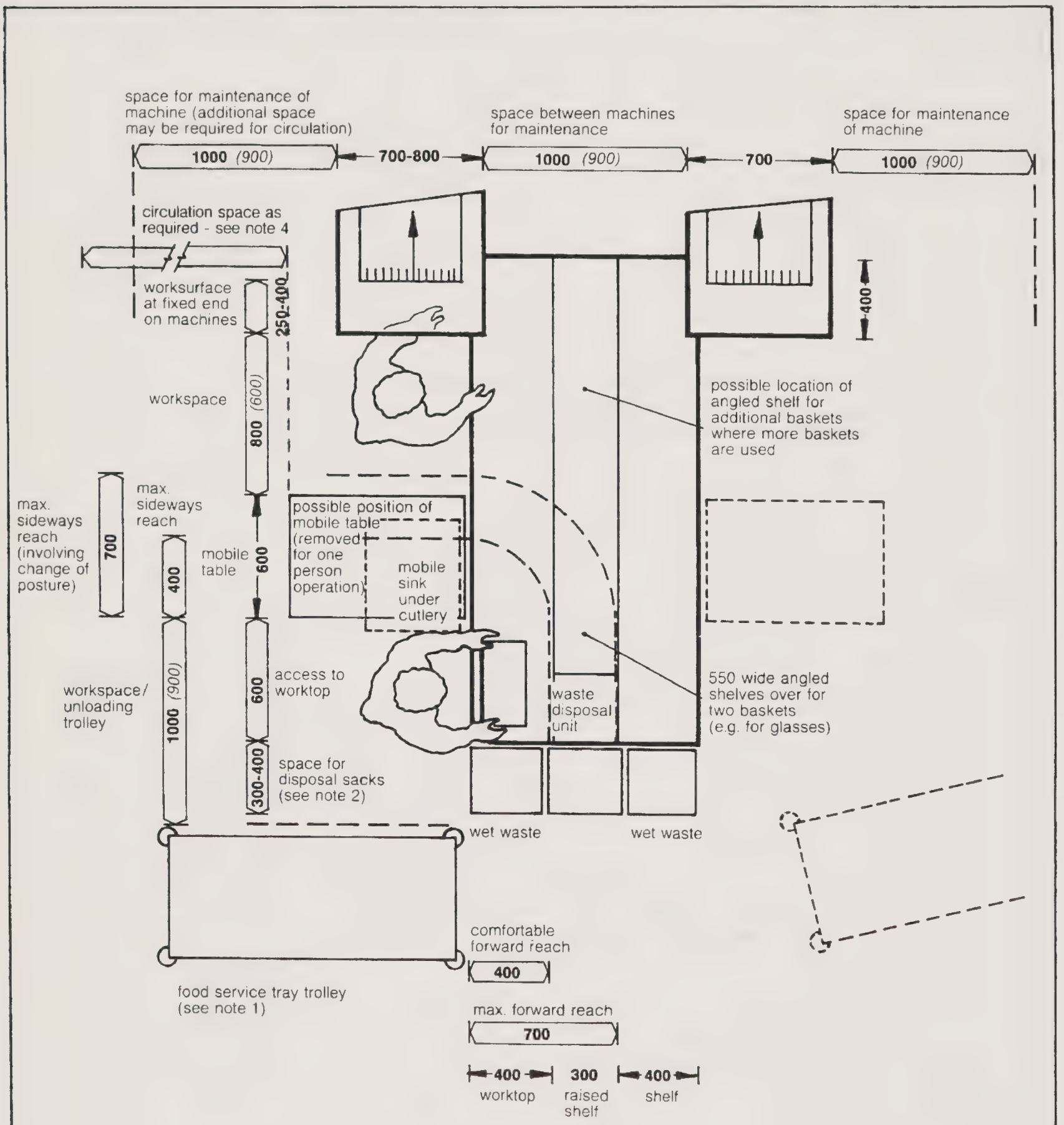
Stripping trays, sorting and loading machine (operation of two machines) with two persons per machine) See also Dishwasher (2) & (3) data sheets

NHS Estates Ergonomic data sheet
Component-user data sheet, not to scale

Dishwasher (1)

Automatic - Flight type

Users:
Catering staff



1350 *(1300)*

Preferred minimum: *Restricted minimum (not recommended for general use: see explanatory notes)*

Notes:

1. Other types of trolley may also be unloaded e.g. self-clearing tray trolleys from dining room, staff clearing trolleys. Alternatively a mechanical system may be adopted for returns from the dining room.

2. Disposal sacks should be open topped in this working situation.

3. Arrangement shown is intended as an example only - individual projects will have generated specific requirements for staffing levels, numbers of meals, method of clearing staff dining room etc. which affect arrangements required.

4. Recommended space for trolley circulation and replacement 1100 (1000).

Activities:

Stripping trays and sorting
Sections (see also plan - Dishwasher (1)

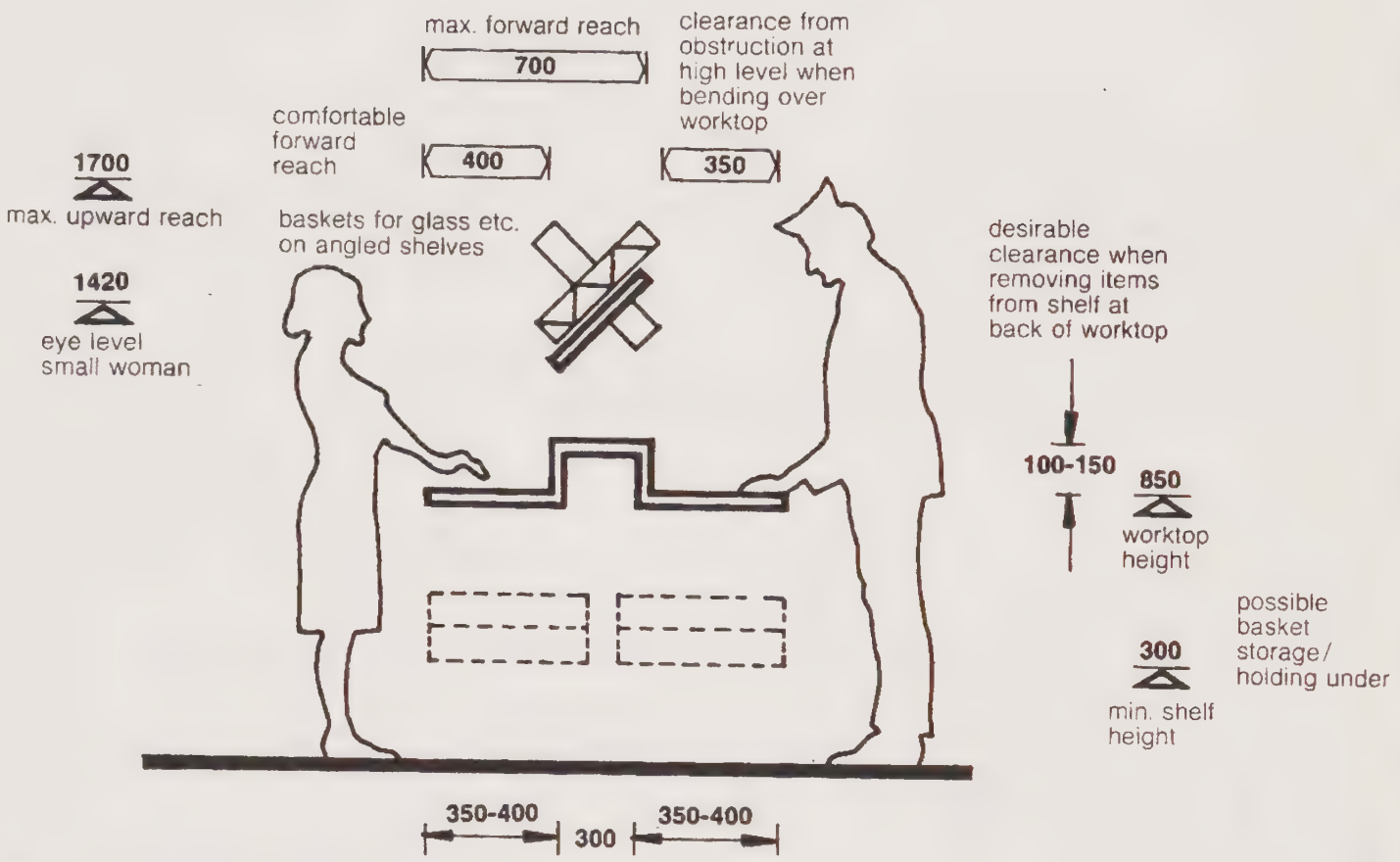
NHS Estates Ergonomic data sheet
Component-user data sheet, not to scale

Dishwasher (2)

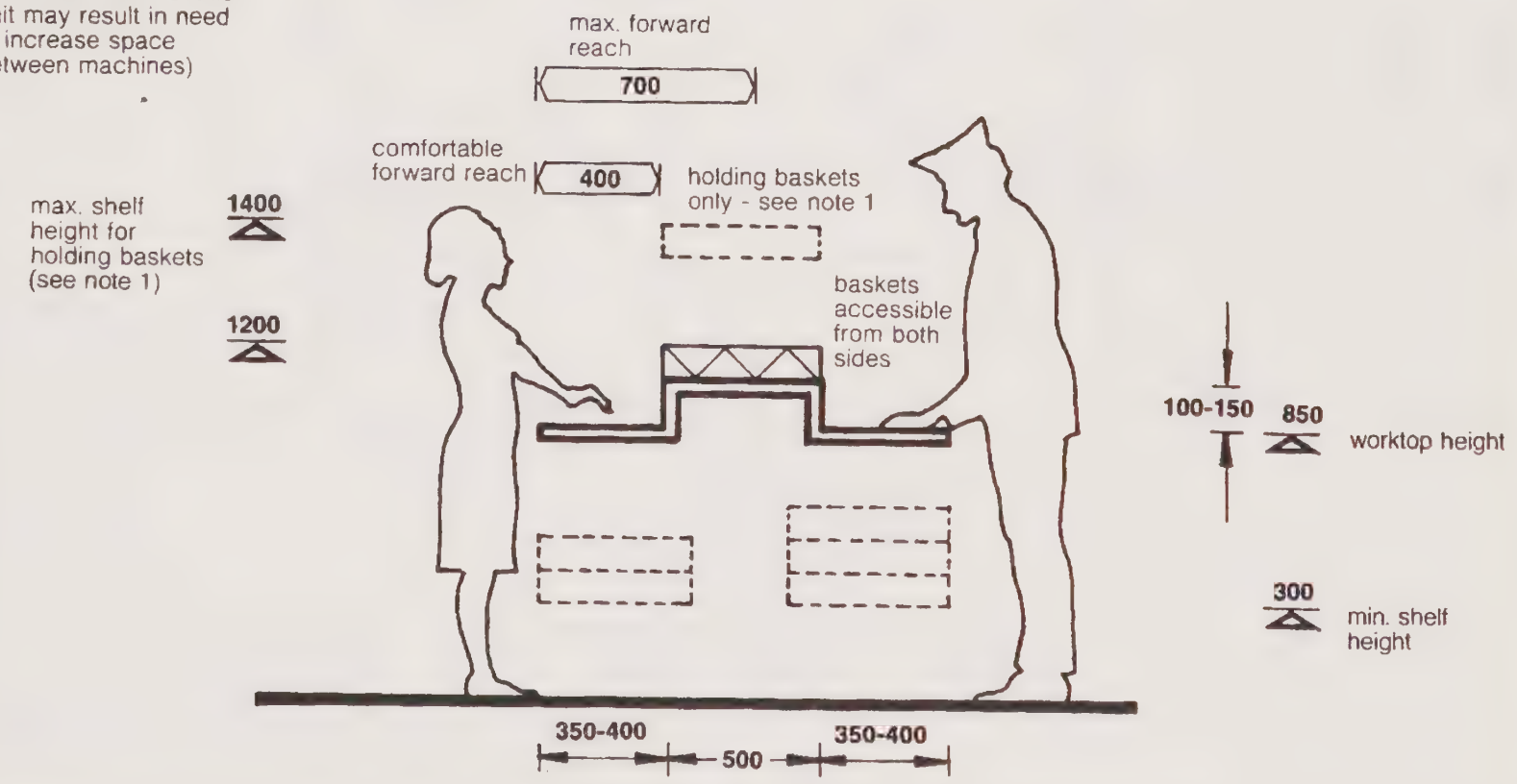
Automatic - Flight type

Users:
Catering staff

SECTION



ALTERNATIVE SECTION
(N.B. extra width of this unit may result in need to increase space between machines)



1350 *(1300)*

Preferred minimum: *Restricted minimum (not recommended for general use: see explanatory notes)*

Notes:

1. It is recommended that the rim height of baskets into which individual items of glass or crockery are placed during sortation should not be above 1200 above floor level. Full or empty baskets may however be stored in shelves up to 1400 high. Where basket is angled to improve visibility into basket, basket rim height may be increased to 1400.

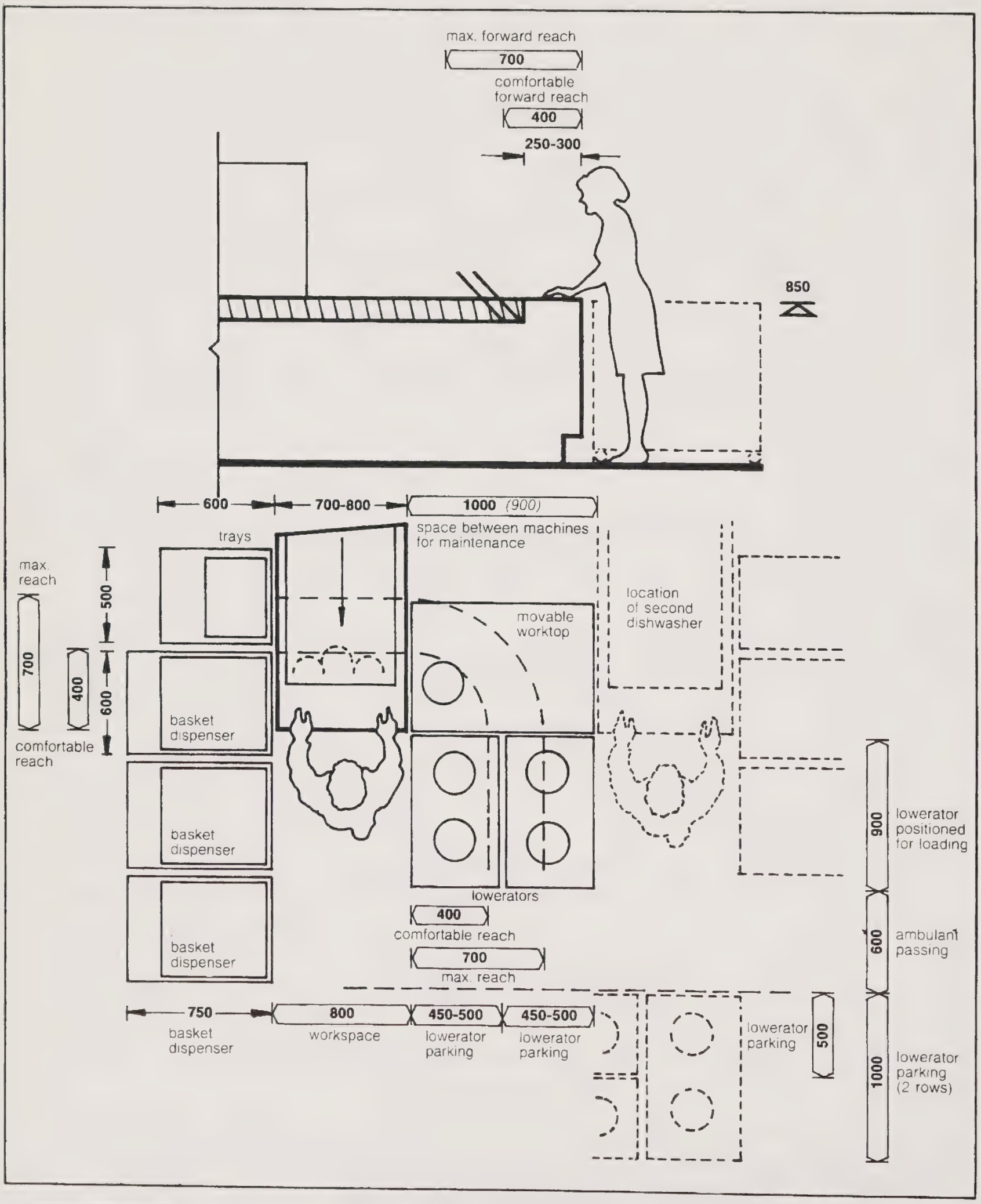
Activities:
Unloading machine, sorting and storing

NHS Estates Ergonomic data sheet
Component-user data sheet, not to scale

Dishwasher (3)

Automatic - Flight type

Users:
Catering staff



1350 *(1300)*

Preferred minimum: *Restricted minimum (not recommended for general use: see explanatory notes)*

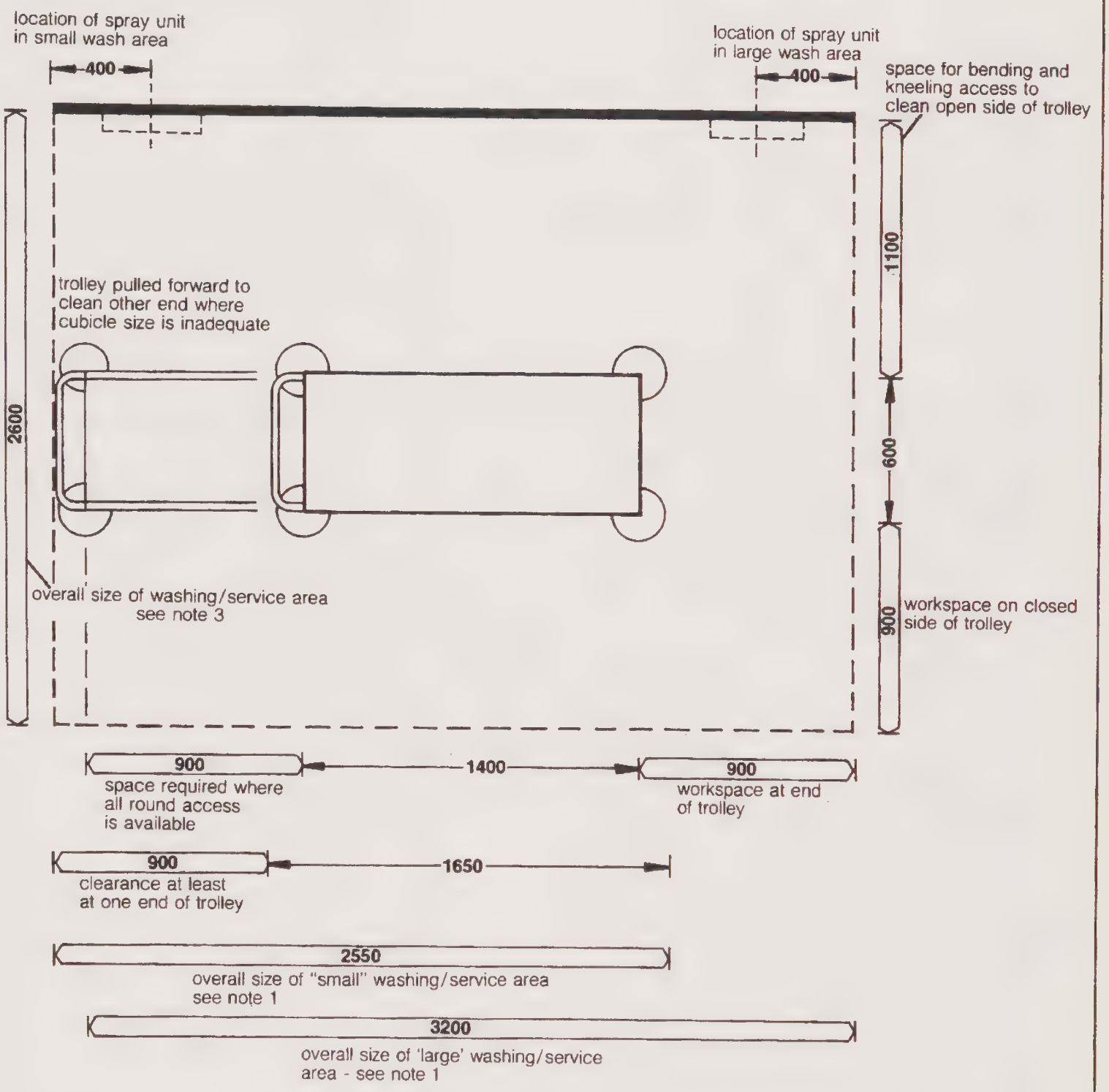
Activities:
Washing and servicing trolley

NHS Estates Ergonomic data sheet
Component-user data sheet, not to scale

Trolley

Food service 30 tray
(also smaller catering trolley)

Users:
Staff


location of spray unit in small wash area
400
location of spray unit in large wash area
400
space for bending and kneeling access to clean open side of trolley
1100
600
900
trolley pulled forward to clean other end where cubicle size is inadequate
2600
overall size of washing/service area see note 3
workspace on closed side of trolley
900
1400
900
space required where all round access is available
workspace at end of trolley
900
1650
clearance at least at one end of trolley
2550
overall size of "small" washing/service area see note 1
3200
overall size of 'large' washing/service area - see note 1

1350 *(1300)*

Preferred minimum: *Restricted minimum (not recommended for general use: see explanatory notes)*

Notes:

1. All round access for cleaning/servicing is preferred where the cleaning workload is high. The need to move the trolley during washing/cleaning is unsatisfactory.
2. The washing area must be suitably screened from adjacent areas during the use of the spray unit.
3. It is recommended that access be via a full width opening. Turning access can then be achieved from a minimum width (1300) corridor. If the opening is reduced, then a wider corridor will be necessary to manoeuvre into a satisfactory position in the bay.
4. A sink with drainer may be required to wash removable parts of trolley.

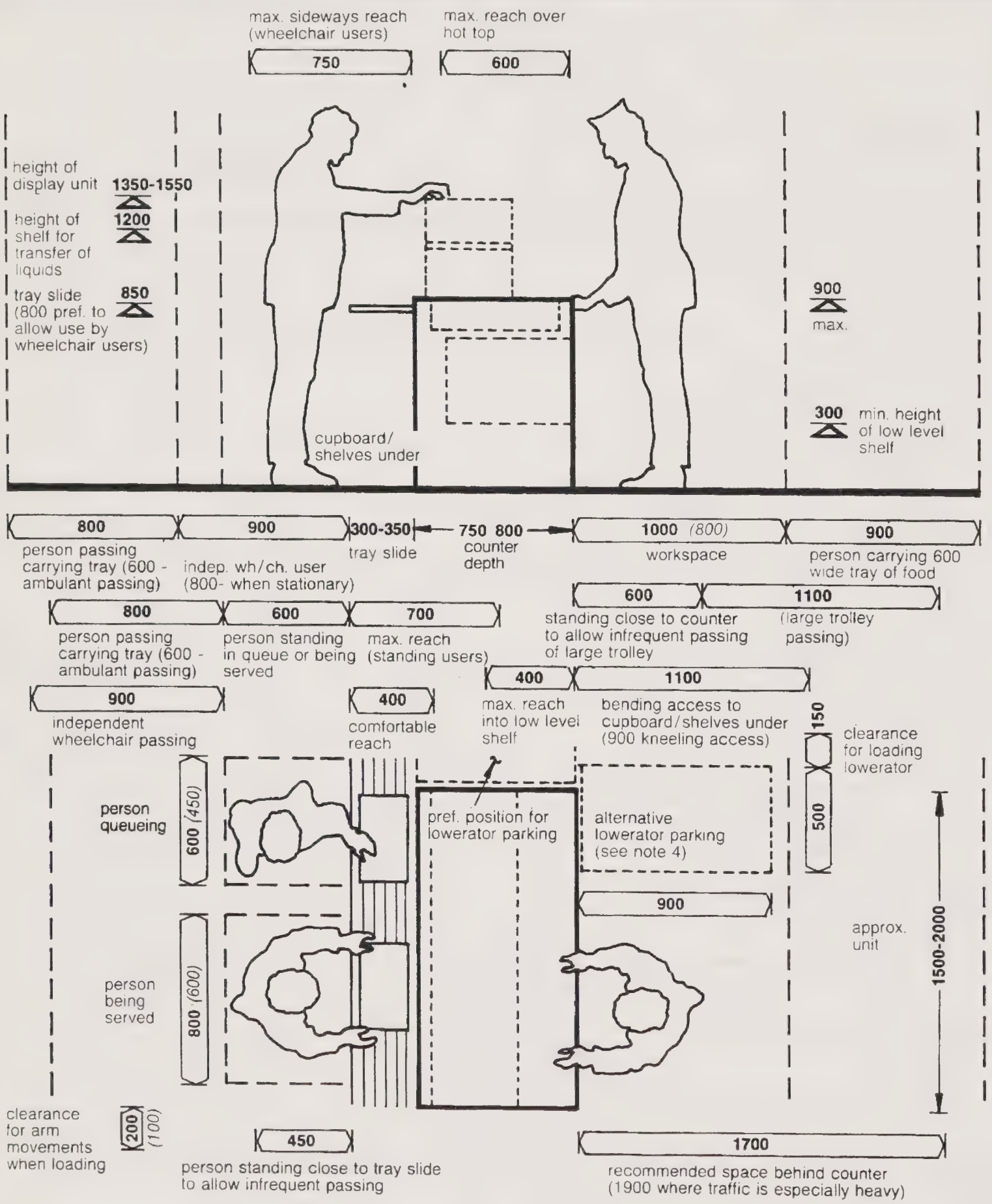
Activities:
Serving of hot and cold food - linear arrangement of counters
(see also Service counter (2) & (3) for angled arrangement)

NHS Estates Ergonomic data sheet
Component-user data sheet, not to scale

Service counter (1)

Hot/cold
Bain marie/Plain top

Users:
Catering staff (serving), staff, visitors and occasional wheelchair users



1350 *(1300)*

Preferred minimum: *Restricted minimum (not recommended for general use: see explanatory notes)*

Notes:

1. Units may have plain or bain marie tops with shelves or display units over, and shelves accessible from the working side only under.
2. Where counters are backed by other equipment e.g. hot cupboards, equipment parking, etc., see relevent data sheet as an increase in space may be required. Space will also depend on the frequency of concurrent use of back to back components and the need to maintain space for circulation.
3. Units may be arranged
(a) linear - resulting in queueing parallel to units as shown.
(b) angled - (see sheet 2)
4. Alternative lowerator parking position shown is not generally recommended as it restricts free circulation behind counter.

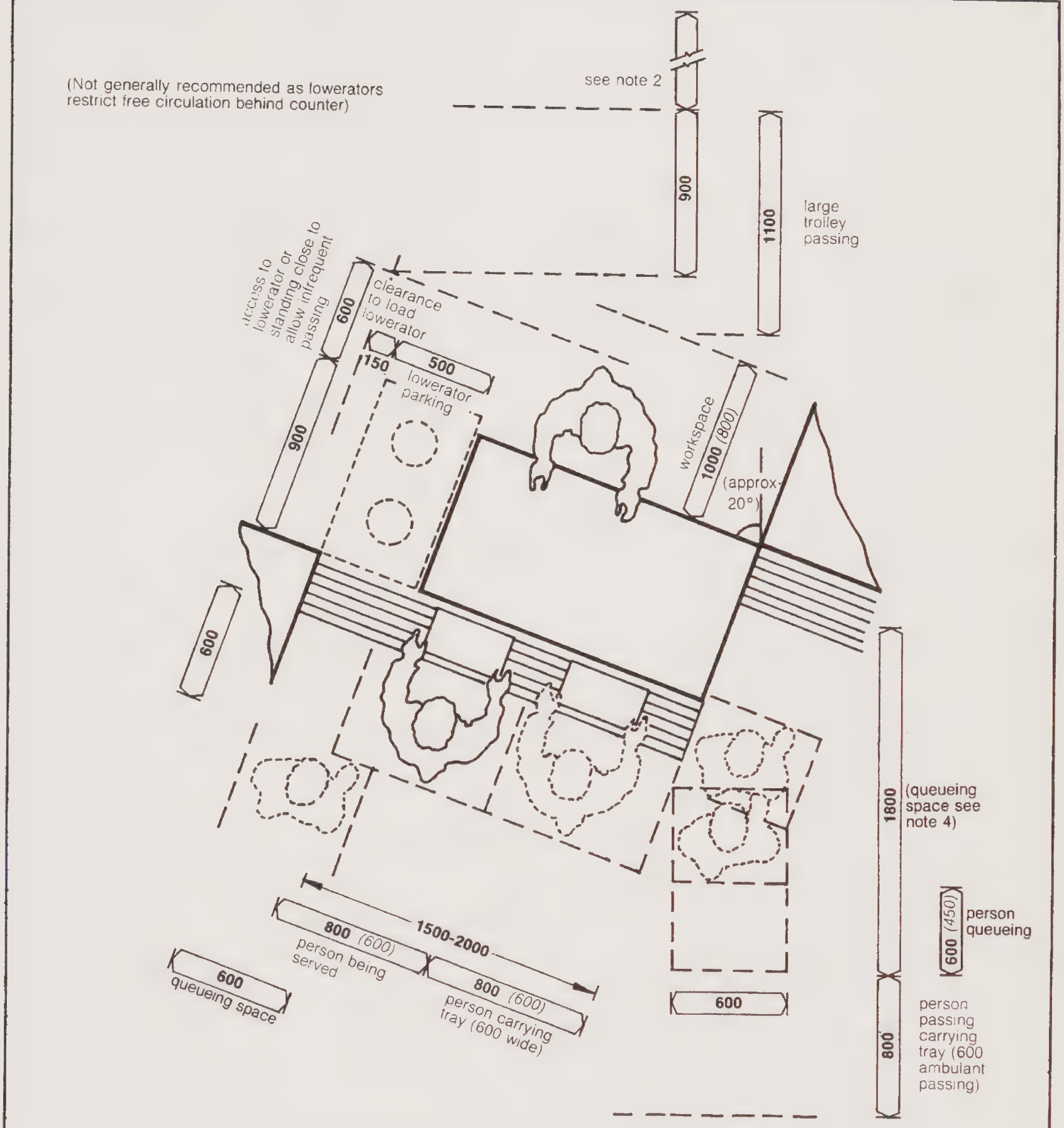
Activities:
Serving hot and cold food (free flow system) (see also Service counter (1) for linear arrangement)
Lowerator parked in bay at end of counter (see also Service counter (3) for alternative arrangements)

NHS Estates Ergonomic data sheet
Component-user data sheet, not to scale

Service counter (2)

Hot/cold
Bain marie/Plain top

Users:
Catering staff (serving), staff, visitors and occasional wheelchair users.



1350 *(1300)*

Preferred minimum: *Restricted minimum (not recommended for general use: see explanatory notes)*

Notes:

1. Units may have plain or bain marie tops with shelves or display units over, and shelves accessible from the working side only under.

2. Where counters are backed by other equipment e.g. hot cupboards, equipment parking, etc., see relevant data sheet as an increase in space may be required. Space will also depend on the frequency of concurrent use of back to back components and the need to maintain space for circulation.

3. The Free Flow arrangement occupies more space than the linear arrangement, but reduces queueing times during peak periods.

4. A queueing length of space of 1800 provides space for 3 persons queueing or 4 persons in a restricted space.

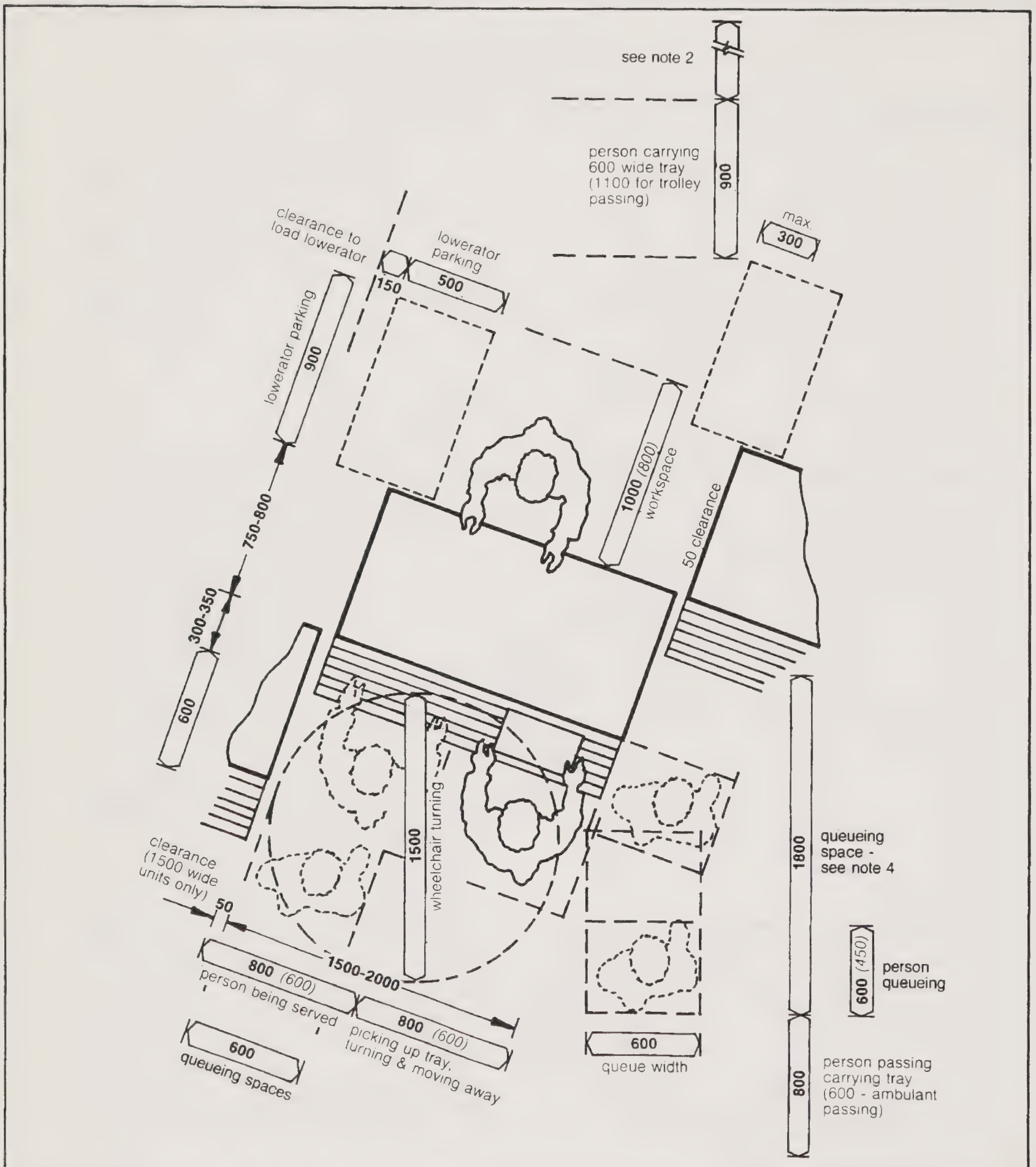
Activities:
Serving hot and cold food (free flow system) (see also Service counter (1) for linear arrangement)
Lowerator parked in bay at end of counter (see also Service counter (2) for alternative arrangements).

NHS Estates Ergonomic data sheet
Component-user data sheet, not to scale

Service counter (3)

Hot/cold
Bain marie/Plain top

Users:
Catering staff (serving), staff, visitors and occasional wheelchair users.



1350 *(1300)*

Preferred minimum: *Restricted minimum (not recommended for general use: see explanatory notes)*

Notes:

1. Units may have plain or bain marie tops with shelves or display units over, and shelves accessible from the working side only under.

2. Where counters are backed by other equipment e.g. hot cupboards, equipment parking, etc., see relevant data sheet as an increase in space may be required. Space will also depend on the frequency of concurrent use of back to back components and the need to maintain space for circulation.

3. The Free Flow arrangement occupies more space than the linear arrangement, but reduces queueing time during peak periods.

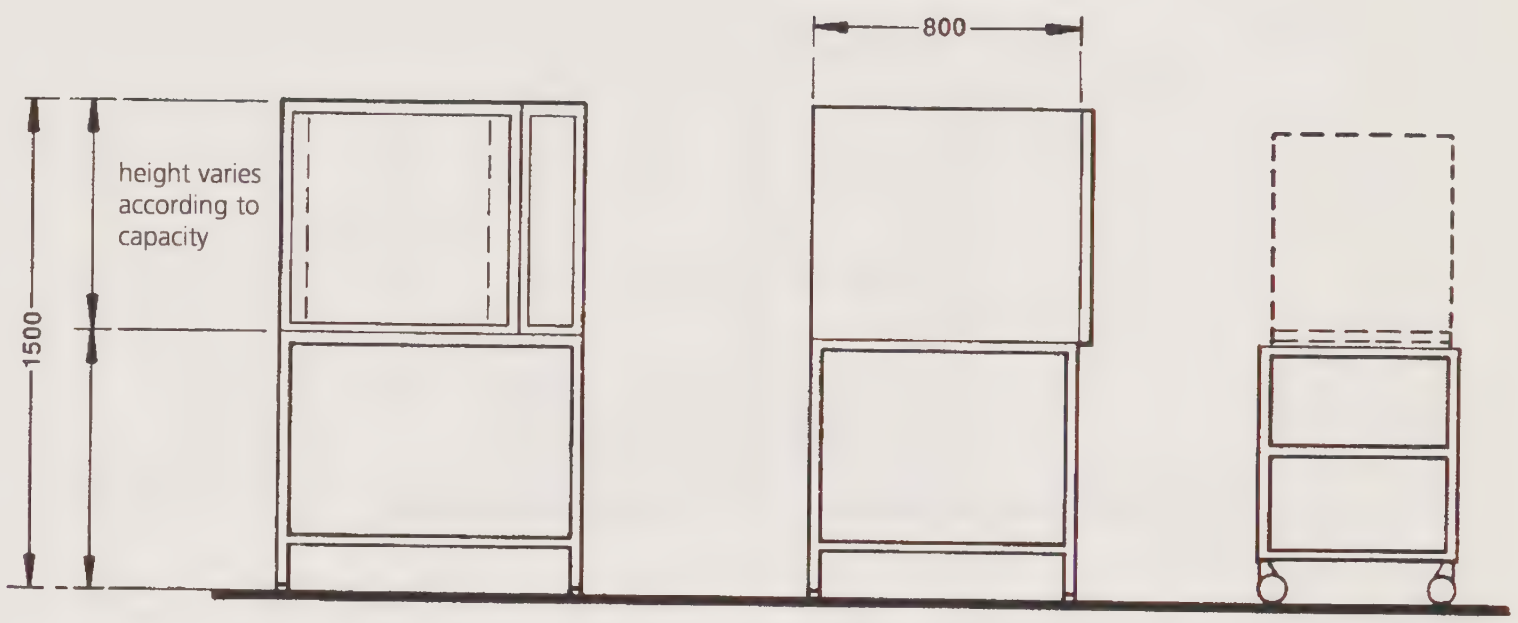
4. A queueing length of space of 1800 provides space for 3 persons queueing or 4 persons in a restricted space.

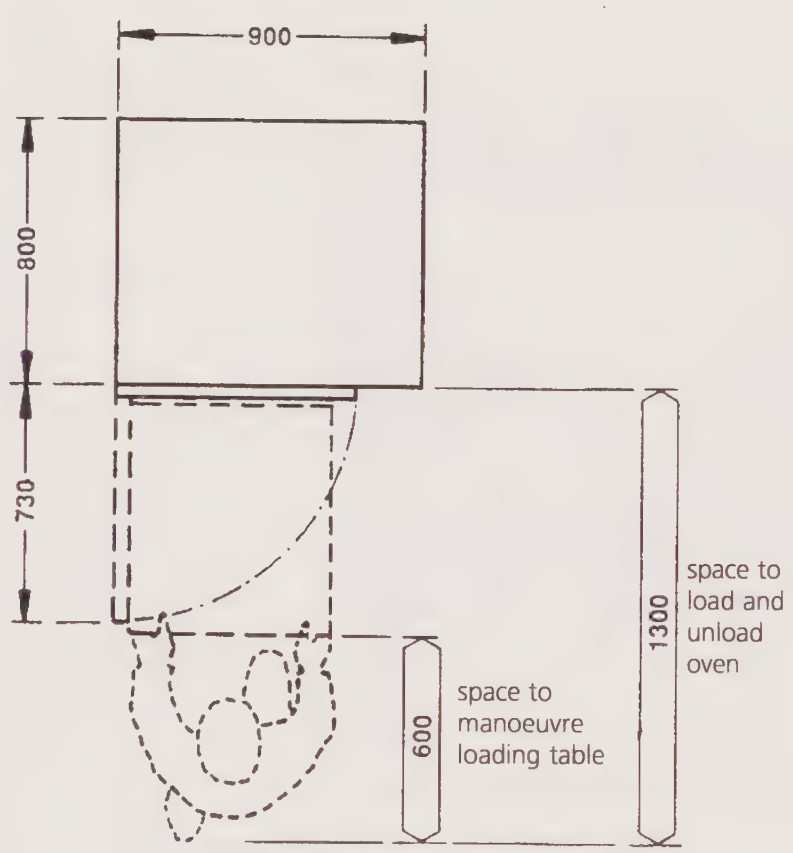
Activities:
Regeneration of chilled food
in bulk food containers

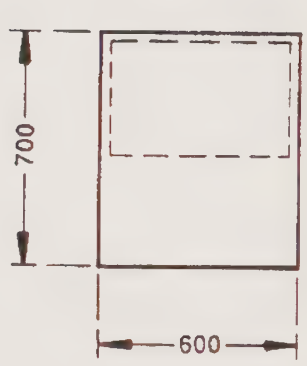
NHS Estates Ergonomic data sheet
Component-user data sheet, not to scale

Regeneration oven with loading table & inset rack

Users:
Catering staff, Staff







1350 *(1300)*

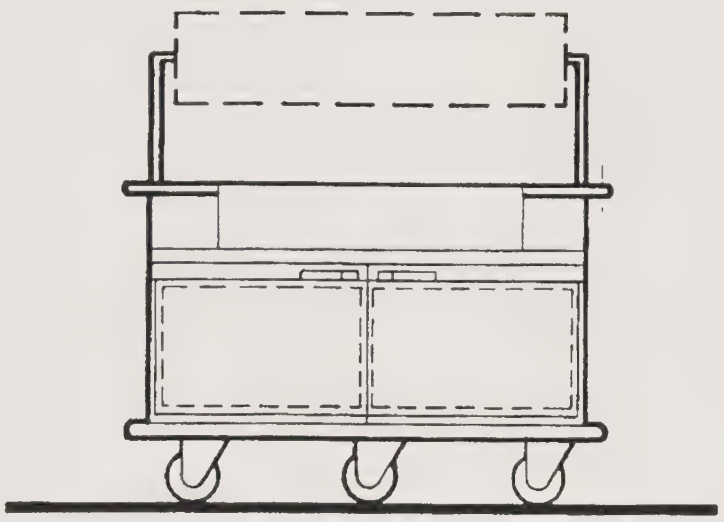
Preferred minimum: *Restricted minimum (not recommended for general use)*

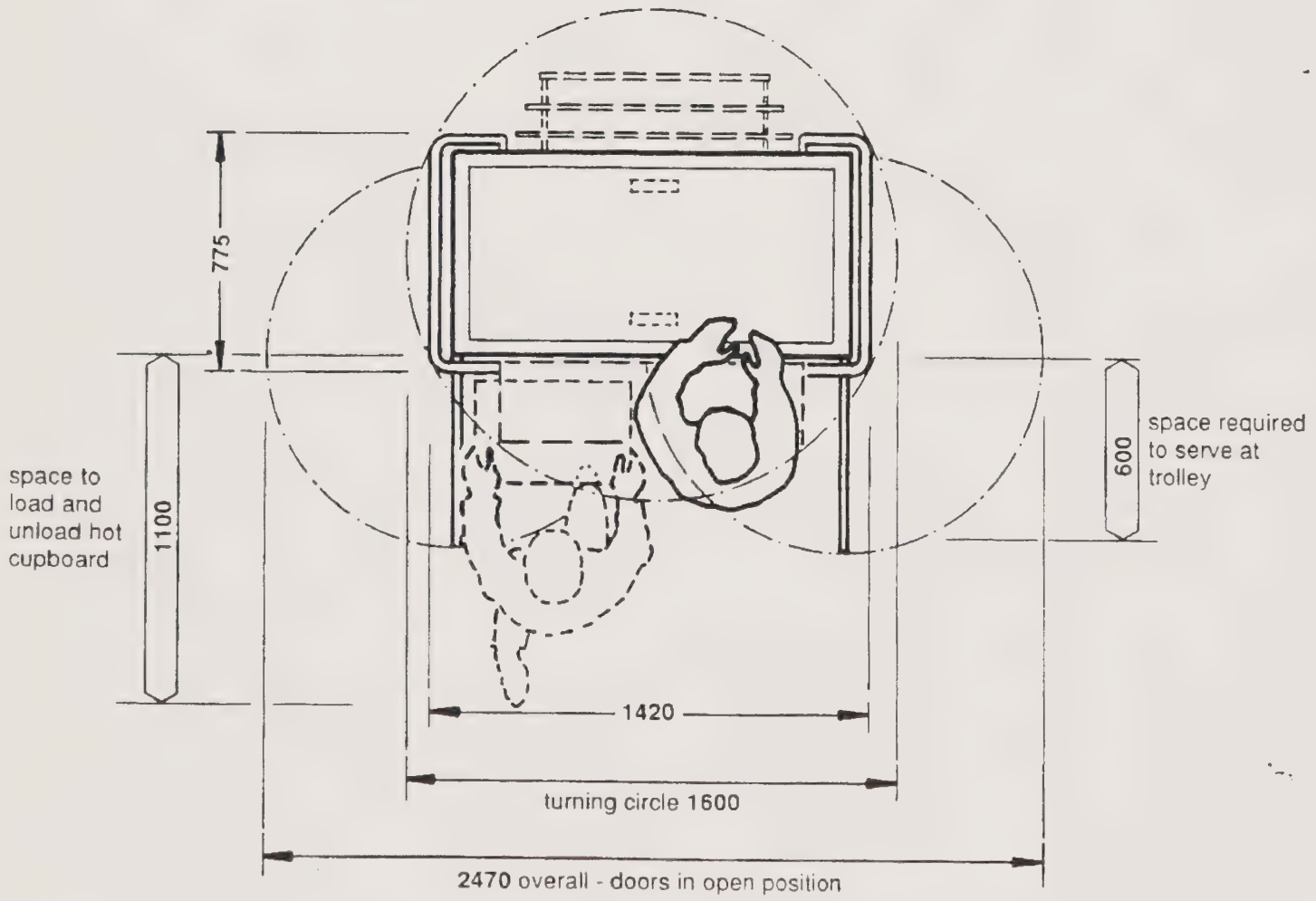
Activities:
Regeneration of chilled food
in bulk food containers

NHS Estates Ergonomic data sheet
Component-user data sheet, not to scale

Hostess regeneration trolley with chilled and hot units

Users:
Catering staff, Staff





1350 *(1300)*

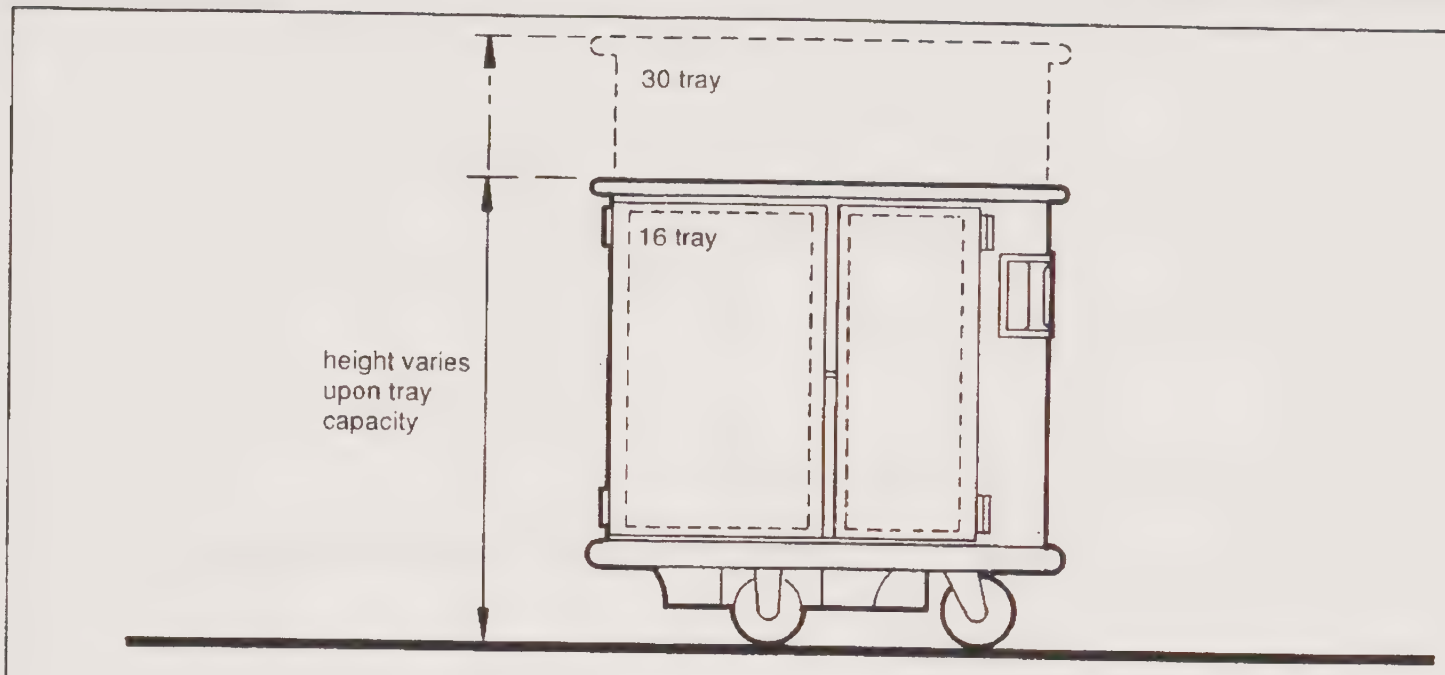
Preferred minimum: *Restricted minimum (not recommended for general use)*

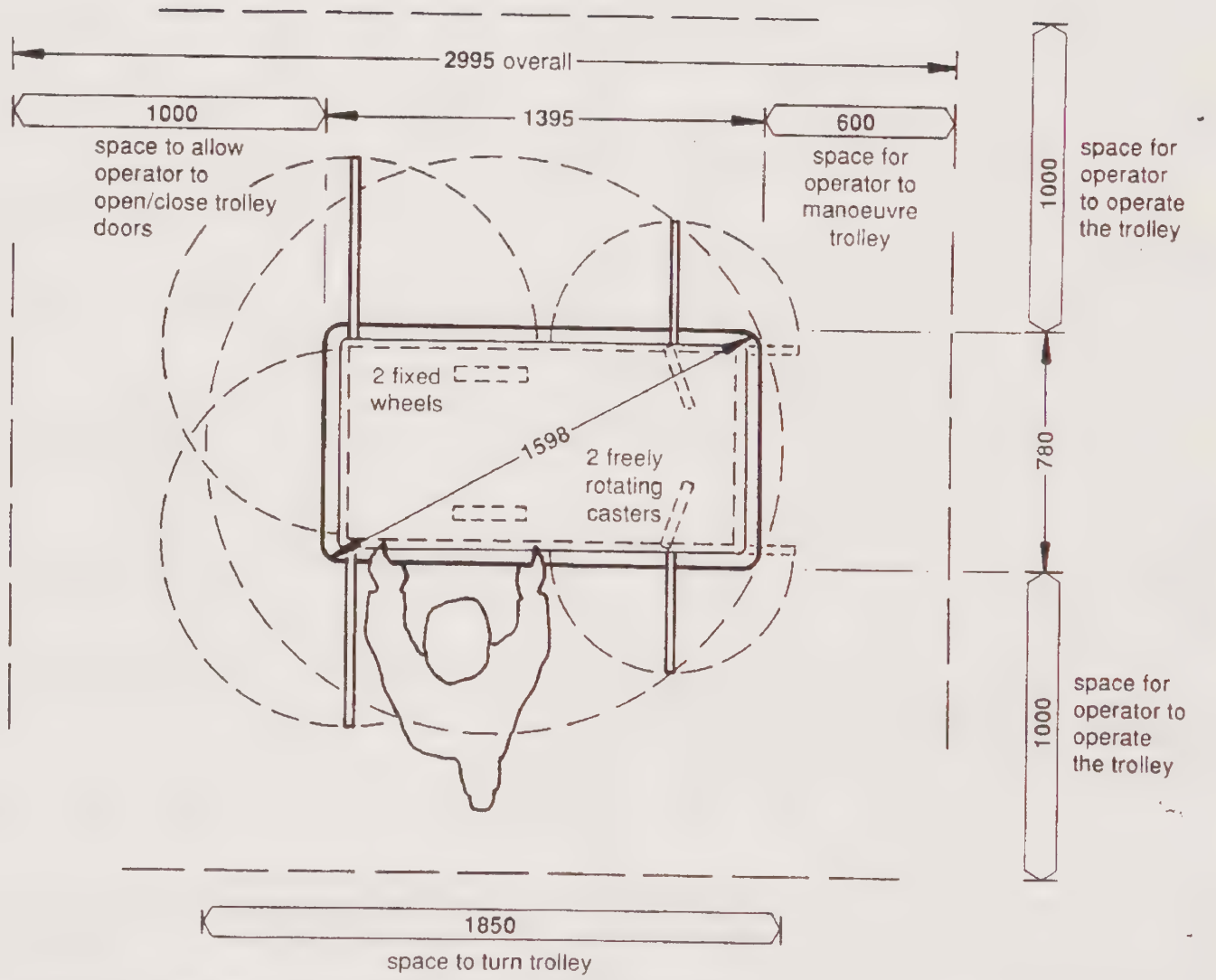
Activities:
Regeneration of chilled food
in bulk food containers

NHS Estates Ergonomic data sheet
Component-user data sheet, not to scale

Combination trolley with hot/cold units

Users:
Catering staff, Staff





1350 *(1300)*

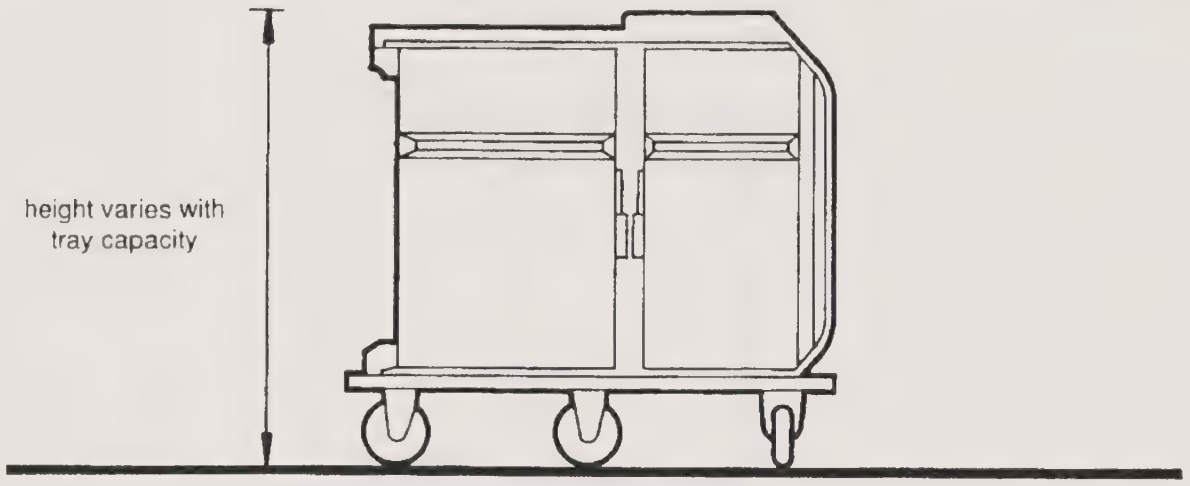
Preferred minimum: *Restricted minimum (not recommended for general use)*

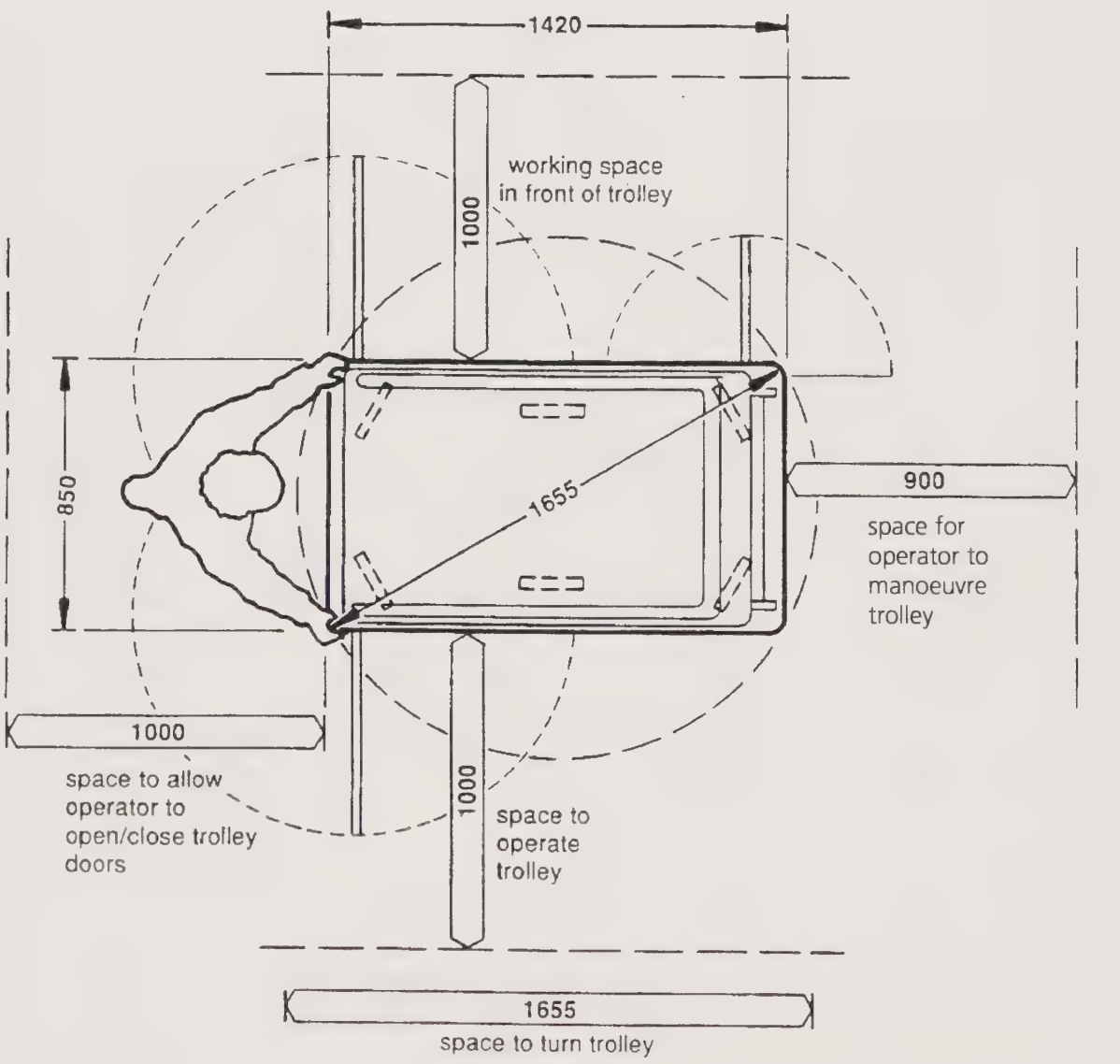
Activities:
Regeneration of chilled food
in bulk food containers

NHS Estates Ergonomic data sheet
Component-user data sheet, not to scale

Combination trolley with hot/cold units

Users:
Catering staff, Staff





1350 *(1300)*

Preferred minimum: *Restricted minimum (not recommended for general use)*

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